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ABSTRACT

The current state of the art in vocational assessment is explored in 46 papers: "Vocational Evaluation: An Experimental Trend in Vocational Assessment" (Nadolsky); "Certification for Teachers and Vocational Evaluation Specialists" (Meers); "Marketing Vocational Education" (Williamson); "Norms, Reliability, and Validity in Commercial Vocational Evaluation Systems" (Botterbusch); "Research Needs and Vocational Assessment as a Science" (Menz); "Vocational Evaluator as Expert Witness" (Ellis); "School-Based Vocational Assessment" (Peterson); "A Model Vocational Evaluation Program for the Learning Disabled Adult" (Long, Hicks); "A Work Measurement Approach to Functional Assessment" (Black, et al.); "Further Development of the Vocational Decision-Making Interview for Handicapped Populations" (Czerlinsky); "A Comparative Study of Performance Scores on the Valpar Component Work Samples" (Dion); "Valpar Component Work Samples: A Correlation Analysis" (Dion); "A Psychovocational Evaluation Model" (Gruehagen, Mohr); "Evaluation of Prevocational Skills in Public School Settings" (Phelps); "The Regional Vocational Assessment Center" (Kapland); "Services of a Special Needs Evaluation Center" (Bohnenstiehl); "Introduction to Microcomputers" (McDaniel); "Computer Software for Assessing and Shaping Motor Performance in Vocational Evaluation and Adjustment Programs" (Coker, Blakemore); "The Use of Computers in Vocational Assessment" (Tango); "Employment through Rehabilitation Technology Awareness" (Johnson); "Microcomputers as Prosthetic Aids for the Severely Physically Disabled" (Long, Hicks); "Ethical Dilemmas--Differences in the Public and Private for Profit Practitioners' Point of View" (McClanahan); "Effective Vocational Evaluation of Non-English Speaking Individuals (Edgcomb); "A Triadic

Approach to the Vocational Assessment of the Industrially Injured" (Stewart, et al.); "Vocational Assessment of Chronic Pain Syndrome Patients" (Costello); "Vocational Assessment of Psychiatrically Disabled Professionals" (Stone); "A Reappraisal of Vocational Evaluation from an Ecological Systems Perspective" (Szymula, Schleser); "New Directions for Vocational Assessment" (Hastings); "Career/Vocational Assessment in the Public School Setting" (Sitlington, et al.); "Levels of Worker Functions Claimed by Valpar for Its Work Samples Compared to Those Determined through Job Analysis of the Work Samples" (Clark); "Vocational Outcomes Associated with Lower Extremity Amputations" (Roush); "A Work Hardening Model for the 80s" (Smith, McFarlane); "Physical Capacity Evaluation and the Work Hardening Program" (May); "Identifying Optimal Working Conditions for Persons with Low Vision--Who Is Responsible?" (Small); "Vocational Evaluation of Blind and Visually Impaired Persons" (Peterson); "The Vocational Evaluation of Head Injured Patients" (Weinberger); "Prevocational Evaluation: A Mind Set or a Process" (Coffey, et al.); "A Hierarchical Model of Vocational Evaluation" (Mason); "Short Term Training of Vocational Assessment Personnel" (Esser); "The Career Assessment Process in the Intermediate District" (Murray, Skaja); "Ohio School Based Work Evaluator Teacher Certification Program" (Napier); "A Comprehensive Employability Assessment Strategy for Disabled Persons" (Roessler, et al.); "Vocational Assessment of Learning Disabilities" (Hartlage, Telzrow); and "Vocational Assessment of Deaf and Hearing Impaired Persons" (Cotter). (MN)

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# NATIONAL FORUM
# ON
# ISSUES
# IN
# VOCATIONAL
# ASSESSMENT

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## THE ISSUES PAPERS

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Edited by:

Christopher Smith

&

Ronald Fry

Papers presented at the National Forum on Issues in Vocational Assessment, September 20-22, 1984, at the Atlanta Sheraton Hotel in Atlanta, Georgia.

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# EDITORS' NOTES

The National Forum on Issues in Vocational Assessment has provided the field with a valuable look at the present and future of vocational assessment. The many heads and hands that interacted to stage the forum have prepared a backdrop of professional inquiry that this collection of papers will help preserve. The editors hope that by preserving and disseminating these thoughts on the needs of the field, they will help others meet the addressed needs. These papers will undoubtedly lead to further discussions of field need issues and, thus, to refinements in proposed solutions.

Word Processor, Mary Bates worked closely with the editors to make these papers as error free as humanly possible, while transforming the 46 issue papers into a publication. She performed this task with diligence and good humor; this was no small accomplishment as several months of effort were required.

The ideas, products, services, and opinions expressed in these papers reflect the thinking of their authors. Their inclusion in this publication does not constitute endorsement by the Materials Development Center, Stout Vocational Rehabilitation Institute, University of Wisconsin-Stout, the Vocational Evaluation and Work Adjustment Association, or any co-sponsoring organization.

Christopher A. Smith
Ronald R. Fry
May, 1985

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# Preface

The first National Forum on Issues in Vocational Assessment was held at the Sheraton Atlanta on September 20-22, 1984. This forum brought together nearly two hundred professionals involved in the practice of vocational evaluation from a variety of settings.

The need for a national forum of this type emerged from the growth of concern over vocational assessment issues in public schools, social security disability determination, vocational education, private rehabilitation, school psychology, and general state agency rehabilitation programs. Professionals in different settings and disciplines have realized the necessity for comprehensive vocational assessment services. As these divergent disciplines converged in planning and delivering vocational assessment services, the need for better communication and for a forum for the exchange of information was realized.

Not only did this forum provide the setting for this exchange to begin occurring, it also quite dramatically raised the awareness level for the need for this interchange to continue with those in attendance. Each discipline had information to share, that, although somewhat unique to an individual discipline, could be applied and adapted to other settings.

As the profession of vocational evaluation continues to develop, so does the need for national information exchange opportunities such as this forum. The professional organizations that coalesced to sponsor this forum are challenged to continue this initial effort and bring about future forums.

Gary Sigmon
Past President, VEWAA

## INTRODUCTION

Previous to the 1980's, the use of vocational evaluation services with disabled and disadvantaged populations had been predominantly conducted in facilities which served public rehabilitation populations. At the turn of the decade however, it was apparent that those services were migrating rapidly to new vocational education special needs students, and to the private-for-profit rehabilitation sector. This growth led to the developing Commission on Certification of Work Adjustment and Vocational Evaluation Specialists' Chairman Paul Myers to reflect that the future of certification for vocational evaluators was in the education setting as the potential for certifiable evaluators was four plus times greater than in rehabilitation.

At the same time, the Vocational Evaluation and Work Adjustment Association (VEWAA), the professional organization which had traditionally represented vocational evaluators, was receiving innumerable request to allow potential members to join without joining the parent National Rehabilitation Association. These requests were from evaluators working in other than rehabilitation settings who wanted representation in their specialty without joining a larger organization to which they felt no allegiance. Those evaluators desired interaction and representation for their professional role. Apart from requesting a waiver of NRA dues to join VEWAA, those evaluators were developing their own organizations or requesting increased time on programs in their current organizations to discuss issues, techniques, and models of vocational assessment. Those requests of VEWAA and the growth of organizations interested in vocational assessment led then VEWAA President Walt Pruitt to create a VEWAA Interface committee: 1) vocational evaluators in other than rehabilitation settings were experiencing the same problems that had plagued rehabilitation evaluators; 2) vocational evaluators in school settings were developing a strong animosity toward rehabilitation evaluators because they felt rehabilitation evaluators presented a smug know-it-all image and that VEWAA was not interested in them; 3) whatever setting evaluators worked in, they were starting a separate organization to represent them or changing the nature of their traditional organization; and 4) due to a shift in the job market, a significant number of rehabilitation counselor new graduates were taking positions as vocational evaluators and feeling the professional role conflict of not knowing which professional organization to belong, i.e. VEWAA or the National Rehabilitation Counseling Association (NRCA).

These factors led to the recognition that evaluators from all work settings and different training backgrounds needed to be brought together in a forum to discuss and debate issues and developments in vocational assessment. The VEWAA Interface committee took on this challenge and proposed a National Forum to be co-sponsored by all interested organizations. Those organizations invited to be co-sponsors with the VEWAA included: the American Occupational Therapy Association (AOTA); the Division of Career Development (DCD), a Division of the Council of Exceptional Children; the National Association of Rehabilitation Professionals in the Private Sector (NARPPS); the National Association of School Psychologists (NASP); the National Association of Vocational Educators of Special Needs Persons (NAVESNP), a division of the American Vocational Association; and, the National Rehabilitation Counseling Association (NRCA), a division of the National Rehabilitation Association. All but the American Occupational Therapy Association expressed their willingness to participate in this forum and assigned a member to work with the VEWAA group to make it occur.

To identify the major issues to be discussed, committee member Barbara Greenstein from New York

City took on the tasks of defining issues from the literature and surveying 20% of the VEWAA membership for agreement on those. Similarly, committee member Darrell Coffey of Menomonie, Wisconsin agreed to poll the leadership of the co-sponsoring organizations for their agreement on major issues. The result of these efforts pointed to a marked agreement on six major specific issues and a general agreement on a number of others. In designing the Forum, the committee settled on a structure which would examine the current state-of-the-art in assessment and would facilitate maximum involvement of all participants. To accomplish this and give consideration to all the identified significant topics, the committee decided to invite speakers on the issues which received major attention in the surveys and to open the other topics for participant presentations. Therefore, the original six issues for invited speakers were as follows: 1) A Career Development Approach to Vocational Evaluation; 2) Marketing Vocational Evaluation; 3) Vocational Evaluators as Expert Witnesses; 4) Research Needs and Evaluation Assessment as a Science; 5) Marketing Vocational Evaluation Systems Before Adequate Testing and Validation; and 6) Vocational Assessment Theories, Models, and Applications. To those six major issues, a seventh was added by the VEWAA Board and that was "Certification for Teachers and Vocational Evaluation Specialists." The committee identified the best thinkers known on these topics and approached them to present and received a 100% positive response.

The other identified interest areas clustered around eight board areas which were: vocational assessment of special populations; innovative techniques in vocational evaluation; computers in vocational assessment; training of vocational assessment personnel; physical capacities evaluation; current process and futurism in vocational evaluation; burnout in vocational assessment; and research findings in vocational assessment. Papers were called for in each organization's literature and were ably reviewed by Robert Davis of Indianapolis, Steve Thomas of North Carolina, Pat Sitlington of Indiana, and Dennis Maki of Iowa. The result of those invited and submitted papers are presented in this document which has been so well prepared by Ron Fry and his staff at the Materials Development Center.

The Forum itself drew approximately 200 individuals, presentors and exhibitors interested primarily in one subject, vocational evaluation. There was an excitement present on location which is difficult to communicate here; however it was observed that this was one of those few times at a meeting in which taking notes was a standard procedure and where afternoon sessions were standing room only. Coming away from this Forum, it was obvious that vocational Evaluation has grown up as a profession since the last look at the state-of-the-art ten years ago. Evaluators are questioning, researching, and developing their process and techniques and are in the process of coming of age. It was an awesome experience to witness.

Making this program and this publication a reality involved a number of individuals and organizations. While the work was done by the individuals, organizations gave their full support and encouragement and are commended for the spirit of cooperation which was shown. Particular credit for this has to go to Gary Sigmon who risked a sizable portion of the VEWAA 1984 budget to underwrite any losses and to the 1984 VEWAA Board who went along with Gary although it did not appear to be a financially wise decision at the time. Lastly, the primary workers on the organizing Interfaces committee need a special thanks for all their efforts resulting in this event. They were: Victoria Mason, Cindy Ellis, Linda Ley-Seimer, Larry Ornberg, Gary Sigmon, Rock Weldon, Michael Peterson, Lee Reynolds, Thomas Hohenshil, John Banks, Mike Wada, Robert Davis, Genie Bodenhamer, Carol Wagner, Paul Hoffman, Barbara Hudson, Barbara Greenstein, Darrell Coffey, Myra Small, Denese Murray, Jeani Welsh, Sondra McDaniel, Susan Scott, and Karen Pell.

Randall S. McDaniel
Conference Coordinator

# VOCATIONAL EVALUATION: AN EXPERIMENTAL TREND IN VOCATIONAL ASSESSMENT

JULIAN M. NADOLSKY

**ABSTRACT:** The development of a concept often takes years, decades, or even generations before the practical application of that concept is fully recognized, accepted, and rendered operational. Furthermore, as a concept develops, several noteworthy, but isolated, attempts may be made to apply that concept in different settings prior to its acceptance and widespread application. Such was the case with the development of the concept that underlies the experiential, work-related approach to vocational assessment, which has become known as vocational evaluation.

Hugo Munsterberg is credited with initiating the experiential approach to vocational assessment in the early 1900's. In commenting on Munsterberg's concept of vocational assessment, Moskowitz (1977) related that:

> According to Munsterberg, there were two basic methods for the investigation of job requirements and the development of appropriate aptitude tests. The first method involves the analysis of the task into its psychological components and the creation of separate tests to assess each component. But this type of analysis is inappropriate or meaningless in many instances, and the appropriate method for those cases is to develop, in the laboratory, a "task-in-miniature" that combines the major elements of the job and then to assess the applicant's total performance on the task (p. 835).

Munsterberg applied the concept of work-related experiences in vocational assessment when he developed a miniature simulated task or laboratory game to select trolly car motormen for the Electric Railway Service of Boston.

In subsequent years, other isolated experiential tasks were developed for use in different settings to determine whether individuals displayed the type of talent or skill essential to the performance of specific industrial jobs, professional activities, military duties, and creative work. For example, Treat (1929) reported that the I.R.E. Trimming Test, a practical task that involved the use of scissors to cut between a pair of narrowing lines, correlated .69 with ratings of power-sewing machine trainees. The relationship between scores on a Metal Filing Work Sample, a practical task designed to measure one type of skill applied in dentistry, and grades in dentistry courses was described by Bellows (1940). According to Cronbach (1960), several tests that employed simulated experiential tasks (i.e., the Complex

Coordination Test, the Rotary Pursuit Test, the Two-Hand Coordination Test, the Pursuit Confusion Test, and the Rudder Control Test) were developed and used by Air Force psychologists to assist in the selection of pilots during World War II. In addition, a few applied tests of artistic creative ability, which involved drawing specific objects in perspective and following cue lines to independently create a freehand sketch, were developed during the 1930's. The majority of these early experiential work-related tasks or applied tests were developed for use in specific settings; most of them were not published and, therefore, had limited application.

Since the mid-1950's, several applied tests, which involve the application of knowledge or skill required in specific occupations or areas of work, have been developed and are currently available from various test publishers. These instruments include tests of computer programming, computer operating, musical talent, artistic ability, typing skill, and related occupational knowledge or skill. Many of these applied tests are of pencil-and-paper variety and do not require the use of tools, equipment, or materials that are commonly encountered in the occupations under consideration. Furthermore, these applied tests have not been extensively or systematically employed to select applicants or candidates for occupations or training programs that exist within industrial firms, business establishments, governmental agencies, the military services, or educational institutions. Nor have they become an integral component of traditional vocational assessment programs.

Rather, vocational assessment programs have traditionally placed emphasis on the use of tests to assess the degree to which individuals possess different levels or types of abstract traits or characteristics that are assumed to be predictive of vocational success. These programs rely heavily on tests of general intelligence, aptitude, achievement, interest, and personality to measure individual capacities. Once obtained, these measures are then related (either formally or informally) to the worker capacity requirements of various occupations.

This abstract exercise in logic, which provides the basis for the traditional approach to vocational assessment, was derived from Alfred Binet's concern with the measurement of "individual differences" among school-age children in the early 1900's. Due to its expedient and economical nature, this approach has not only persisted, but has become the most prevalent method of vocational assessment in our society. Thus, tests are currently used in most vocational assessment programs to measure isolated traits that individuals possess, a concept that Munsterberg felt was inappropriate or meaningless.

Although the concept underlying the use of work-related experiences in personnel selection was first developed and applied in the early 1900's, to date, that concept has failed to gain widespread acceptance within the mainstream of the vocational assessment movement. But during the past 25 years, increasing emphasis has been placed on the systematic use of work-related experiences to determine the vocational potential of individuals who have special needs and are handicapped for employment. An experiential trend in vocational assessment, which appears to have had a lasting effect on the vocational assessment movement, was initiated by the Institute for the Crippled and Disabled when it published the "TOWER" (Testing, Orientation, and Work Evaluation in Rehabilitation) System in 1957. Within a decade after the publication of the "TOWER" System, a new discipline emerged as an experiential extension of the vocational assessment movement. This discipline, known as vocational evaluation, relies heavily on the systematic application of practical work experiences to assess vocational potential. Thus, after several decades and many isolated attempts at applying work-related experiences to vocational assessment, the concept proposed by Munsterberg has not only been recognized, accepted, and rendered operational, but has also provided the basis for the creation of a new discipline.

### The Nature of Vocational Evaluation

Vocational evaluation may be defined as a process that is designed to *assess* and *predict* the work behavior and vocational potential of individuals who are handicapped for employment, primarily as a result of physical, mental, or emotional impairments. This definition implies that there is a need for two distinct types of technology in vocational evaluation. One type of technology is needed to *assess* the *capacities* of individuals and to *diagnose* their vocational assets and limitations. Another type of technology is needed to *predict* the *capabilities* that individuals will exhibit at work and to render *prognoses* that accurately reflect those occupational areas in which each individual will most likely become involved and achieve success. Both types of technology must be applied in a comprehensive program of vocational evaluation, and the technology selected for use in vocational evaluation should relate directly to the capacity requirements and capability demands of occupations.

Due to the comprehensive nature of this relatively young discipline, the process of vocational evaluation is not well understood, either by the general public or by many individuals who provide vocational evaluation services on a daily basis. Much of the confusion that exists is a direct result of the interrelatedness and interdependency of those concepts which are of central importance to the vocational evaluation process. The concepts capacity and capability, much like diagnosis and prognosis, are closely related to, and dependent upon, one another. These terms are often viewed as interchangeable and used to represent or describe the same concepts. Consequently, to understand the comprehensive nature of the vocational evaluation process, it is necessary to clarify and differentiate between the concepts of *capacity* and *capability* and to distinguish *diagnosis* from *prognosis*.

### Capacity vs. Capability

A capacity may be defined as an inherent attribute of a body, system, or device which enables it to receive or accommodate and store or hold a particular measure of content. Numerical units (i.e., pounds, cubic feet, gallons, and related quantities) are often used to designate capacities since the ability of a particular item to receive or accommodate and store or hold is limited by the inherent qualities of its structure. In other words, the capacity of an item is determined by its volume or by the amount that it is able to contain. For this reason, capacities can be objectively measured.

On the other hand, a capability may be defined as a feature of a body, system, or device that is responsive to action, influence, or development. Capabilities are not inherent, nor are they determined or limited by the structure of an item. Rather, the capability of a particular item is dependent upon the action or influence exerted by or on that item as it is applied in different situations. For this reason, capabilities cannot be objectively measured; they are extremely variable and subjectively derived.

The capacity of an item can be understood by focusing on the amount or volume that it can accommodate or hold, while an item's capability can only be determined by attending to what it is able to do or how it might be used. For example, the capacity of a wastebasket can be objectively determined by measuring the amount or volume that it can hold. But a wastebasket has varying types of capability which enable it to be effectively used for different purposes. In addition to being capable of holding paper, water, sand, or some other material, a wastebasket can also be used as a drum, seat, foot stool, step, planter, ash tray, or to fulfill a variety of other purposes. The specific manner in which a wastebasket is used will be subjectively dependent upon the action or influence exerted on it by others.

However, the capability of a wastebasket is, to a great extent, determined by its capacity. That is, a one-foot high wastebasket with a two gallon capacity might be capable of serving as an effective foot stool, step, drum, or planter, but that same wastebasket does not possess sufficient capacity to render it capable of serving as a comfortable seat. For this reason, the capacity of a body, system, or device imposes limitations on its effective capability but, within these limitations, a wide variety of capabilities exist for any given item.

The terms capacity and capability are applied in vocational evaluation to respectively designate the traits that are required of workers and the tasks that workers must perform to function in various occupations. Worker traits are considered capacities since they are inherent characteristics possessed by individuals and assumed to be normally distributed among the general population. Furthermore, occupations required different types and/or amounts of worker traits, and the degree to which individuals possess these traits can be objectively measured with reasonable accuracy.

On the other hand, the tasks that must be performed constitute the worker capability requirements of occupations since the ability to perform these tasks is dependent upon the actions expressed by individuals as they use the tools, equipment, and materials that are commonly encountered in specific work situations. When confronted with new and different work situations, individuals rely on their background and experience to perform the required tasks. They do not attack work-related problems in a standardized manner, but respond to the situation in their own personal way. For this reason, the capabilities of potential workers cannot be *objectively* measured; they can only be determined by focusing on the manner in which individuals *subjectively* relate to a variety of real or simulated work situations.

As applied in vocational evaluation, worker capacities represent those abstract attributes *possessed* by individuals which can be objectively measured, while worker capabilities relate to those concrete actions or behaviors *expressed* by individuals as they subjectively respond to a given situation. A variety of psychometric instruments are used during the initial phase of vocational evaluation to objectively measure the traits possessed by individuals in relation to the worker capacity requirements of occupations. Worker capabilities are determined by observing an individual's behavior and performance on work samples, situational tasks, simulated work experiences, occupational exploration procedures, and/or job tryouts during the experiential phase of the vocational evaluation process.

## Diagnosis vs. Prognosis

Historically, the terms diagnosis and prognosis have gained widespread use and acceptance within the medical profession. In medical terms, diagnosis refers to the art or act of identifying a disease from its signs or symptoms. A diagnosis is essentially a concise statement or conclusion concerning the nature or cause of a particular condition as derived from its underlying signs or symptoms. Prognosis refers to the prospect of recovery from a given condition as anticipated from the usual course of the disease and peculiarities of the case. It is a forecast or prediction about what the individual can anticipate in the future.

Conceptually, a diagnosis is firmly based upon accumulated knowledge that is commonly understood and shared by members of a particular discipline. It is a categorical approach to understanding and dealing with problems which assumes that conditions which affect individuals can be understood and categorized according to a number of common signs or symptoms. During the diagnostic process, the individual is ignored and attention is focused on the signs or symptoms that are demonstrated and observed. The process of diagnosis gives primary consideration to uncovering information that is internal to the discipline and that can only be understood by individuals trained in that discipline. The patient or client does not have the background necessary to understand this information or to relate it to a diagnostic category.

On the other hand, a prognosis is conceptually based upon the specific characteristics of each individual case. Every prognosis, regardless of related diagnostic category, will be different since they must each be based upon the individual and his or her particular situation more so than upon diagnostic signs or symptoms. Factors that are external to the discipline must be taken into consideration when rendering a prognosis since they will have a marked effect on the accuracy of the prognosis.

Although vocational prognosis is not a new concept it is not well understood. Historically, vocational assessment programs have been rendering vocational prognoses solely on the basis of diagnostic findings (i.e., biographical information, interview data, and psychometric test results). These programs have been involved in a process of categorizing people and rendering predictions or prognoses on the basis of categorical data. In many instances, they have ignored the individual and his or her unique situation and have based vocational predictions on categories of people such as the deaf are good printers, the mentally retarded are best suited for service work, highly intelligent individuals should pursue a professional career, or clerical work is for females.

## Vocational Evaluation in the Vocational Assessment Process

The discipline of vocational evaluation is a definite part of the vocational assessment movement since it utilizes traditional vocational assessment techniques and procedures to diagnose worker capacities. However, realistic work experiences are extensively employed in vocational evaluation to determine worker capabilities. In fact, the reliance on work-related experiences is a central and unique feature of vocational evaluation which provides an identity to the discipline and "sets it apart" from other programs of vocational assessment.

Due to its direct concern with both diagnosis and prognosis, as well as its emphasis on the assessment of worker capacities and the determination of worker capabilities, vocational evaluation has emerged as a comprehensive approach to vocational assessment. The Tenth Institute on Rehabilitation Services (1972) defined vocational evaluation as:

> ....a comprehensive process that systematically utilizes work, real or simulated, as the focal point for assessment and vocational exploration, the purpose of which is to assist individuals in vocational development. Vocational (work) evaluation incorporates medical, psychological, social, vocational, educational, cultural, and economic data in the attainment of the goals of the evaluation process (p. 2).

The second sentence in this definition implies that vocational evaluation is not a free standing or completely autonomous discipline. Rather, it is a discipline that relies on data provided by other professionals to assist in the accurate and economical attainment of its goals. In other words, vocational evaluation incorporates data that was previously obtained by other disciplines into its process, instead of requiring a completely new evaluation of an individual's status in those areas that might directly affect the outcome of the vocational evaluation process.

In a similar manner, the discipline of vocational evaluation incorporates previously obtained and relevant vocational assessment data into the evaluation process, rather than using the same or similar instruments of vocational assessment to recollect that data. Thus, vocational evaluation may be viewed as the third level of a continuous or sequential vocational assessment process. Task Force Number One of the Vocational Evaluation Project (1975) indicated that the vocational assessment process consists of three levels; namely, (a) First Level of Assessment: Screening, (b) Second Level of Assessment: Clinical, and (c) Third Level of Assessment: Vocational Evaluation. In discussing the delivery of vocational assessment services, Task Force Number One (1975) related that:

> ....all clients within a service program go through a basic assessment process, which can be termed "screening." Typically, it is similar to the guidance procedures used by high school counselors or rehabilitation counselors in one or two interviews. Extensive reliance is placed on client statements of choice, competence, and job history. It may be supplemented with additional routine information available in a program, such as normed aptitude tests and medical examinations.
>
> The second level of assessment can be termed the clinical, case study, or in-depth vocational counseling approach. In addition to the methods used in screening, the clinical method uses detailed recovery of personal history, securing and synthesizing the findings of other agencies and professional persons, use of clinically interpreted tests, and several hours of interaction between counselor and client.
>
> Vocational evaluation is at the third level of assessment in a sequential strategy. This assessment process involves placing the client into real or simulated work experience within a controlled setting. It typically involves several days of observation and the interpretation of these observations.
>
> The three level sequential assessment process has a number of advantages to it. First it is comprehensive: all of the clients within a particular service program can be accommodated within the process. Second, the strategy is parsimonious, or economically conservative: the first procedure used is the most simple, common, and economical; more elaborate, difficult, and expensive assessment processes are used only if necessary. Third, the strategy is direct: as soon as a reasonable course of action becomes apparent it is effected at once, instead of being subjected to a more elaborate assessment. Fourth, the strategy practices conservation: the assessment findings of the previous assessment processes are retrieved and passed along, rather than recreating this information at each new level of assessment. Fifth, the strategy is cost-effective.... (pp. 30, 32).

Thus, by its very nature, vocational evaluation is a comprehensive process. It not only makes use of data obtained from other disciplines, but also systematically applies its own series of realistic work experiences with each individual served. Vocational evaluation is the third level of a sequential vocational assessment process, designed for individuals who require exposure to the realistic and experiential demands of specific areas of work in order to determine their vocational potential.

### The Expansion of Vocational Evaluation Services

Vocational evaluation is a service that developed and evolved within the context of the vocational rehabilitation movement in an attempt to accurately assess the work behavior and vocational potential of handicapped individuals. Neff (1968) traced the evolution of vocational evaluation and indicated that vocational evaluation services are a logical extension or outgrowth of the mental testing approach to vocational assessment. Neff further suggested that vocational evaluation services were designed particularly for a handicapped population, a population whose work behavior and vocational potential could not be adequately assessed or effectively determined through the use of traditional mental or psychological testing procedures. Consequently, the field of vocational evaluation owes its existence to the vocational rehabilitation movement and many vocational evaluators remain directly involved with programs that are primarily designed to serve clients of the state/federal vocational rehabilitation system.

But due to the experiential nature of its work-related technology and its emphasis on self-involvement in vocational decision-making, vocational evaluation services have been incorporated into the structure of various social agencies and institutions during the past decade. In addition to being a service offered by rehabilitation facilities, vocational evaluation is currently found in public schools, vocational-technical schools, community colleges, hospitals, mental health centers, manpower programs, and in a variety of private business or professional settings. Although most of our adult population could derive personal benefit from participating in a vocational evaluation program, these programs have become essential to the accurate vocational assessment of those individuals who are non-verbally and experientially oriented, intuitive thinkers. In other words, vocational evaluation programs are not only beneficial, but also essential to the career planning and subsequent vocational development of individuals whose thought process is primarily governed by the right cerebral hemisphere. Such individuals have special needs in our modern society since they derive minimal benefit from exposure to the verbally-oriented programs and procedures that have been traditionally and extensively applied in our service-oriented agencies and institutions.

The majority of individuals who receive vocational assessment services from various social agencies and institutions do not require vocational evaluation; they have sufficient verbal and logical reasoning ability to benefit from the application of traditional verbally-oriented procedures employed during the first and second levels of the vocational assessment process. However, within any service population there exists a group of individuals whose special needs do not permit them to receive optimum benefit from their participation in a traditional program of vocational assessment. These individuals are predominantly nonverbally oriented, intuitive thinkers and require an experiential program of vocational assessment to effectively determine their vocational potential. Although it is impossible to specify the exact number of individuals who have special needs and require vocational evaluation services, Task Force Number One of the Vocational Evaluation Project (1975) indicated that:

> There are no accurate figures on the sizes of the special needs groups. However, there are some studies done in different

> manpower service programs (primarily education, labor, and rehabilitation) which have estimated the proportion of clients from a target population who fall into a special needs group. These estimates range from 10% to 20%, but cluster around 15% (p. 18).

Based on these estimates, approximately 15% of the population served by any agency or institution that is concerned with the career preparation or vocational development of its clientele will require vocational evaluation services. And since public schools, vocational-technical schools, community colleges, manpower agencies, mental health centers, and related community facilities are directly concerned with career preparation or vocational development, an increasing number of these agencies or institutions have incorporated vocational evaluation services into their structure during the past decade.

Thus, vocational evaluation can no longer be accurately identified as a service that is designed primarily for clients of the state/federal vocational rehabilitation program. During the past decade, the discipline of vocational evaluation has expanded, beyond the confines of the vocational rehabilitation movement and has become an integral component of the service structure of many other human service agencies and institutions. In commenting on the professionally-related consequences associated with this expansion, Nadolsky (1981) noted that:

> ...., vocational evaluation has emerged as a discipline with a broad base; it does not identify with any one program nor is its practice limited by the needs of a particular referral source.
>
> Because of its broad base, vocational evaluation has the potential to develop an identity as an independent profession. It has become a discipline that must independently establish and maintain its own standards for professional practice, regardless of the specific needs and desires of any one program (p. 70).

Although the development of a broad base is not a distinguishing characteristic of a profession, it does establish a solid foundation for the independent or autonomous operation of a discipline. That is, the pervasion of a service into various sectors of society not only provides visibility to an emerging discipline, but also decreases the likelihood that a specific agency or institution will be able to maintain a controlling influence over the practice of the discipline. Due to its pervasive nature, an emerging discipline will eventually become recognized and accepted by the general public for its separate, unique, and distinct service contributions. Furthermore, as the discipline's practitioners become involved in offering a common program of service, which is based on a shared rationale and a consistent technology, members of the discipline begin to identify with one another, more so than with their particular place of employment. Practitioners feel a need to define, confirm, and protect their identity; they take steps to establish formal lines of communication and develop internal methods for the regulation or control of their discipline and its practice. For this reason, the establishment of a broad base appears to be a necessary, if not sufficient, condition for the professionalization of a service-oriented discipline. And the joint sponsorship of this forum suggests that the discipline of vocational evaluation has acquired such a broad base.

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# CERTIFICATION FOR TEACHERS AND VOCATIONAL EVALUATION SPECIALISTS

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**ABSTRACT:** The question of what type of certification vocational evaluation specialists need to have in order to work in secondary schools is a problem that is currently facing the fields of special education, vocational education, and vocational rehabilitation. A quick review of the last twenty years must be made in order to understand how the dilemma was created, and through this historical perspective, how it might be resolved.

The decade of the sixties brought into full force the Civil Rights Movement. Emotions stemming from the Vietnam conflict combined with the Civil Rights Movement brought about a new awareness of the individual differences that exist in society and of how these differences contribute in their own unique way to make the United States function as it does. The theme that emerged during the sixties was relevancy. What was being taught, the work being done, and the programs being offered had to be relevant. As a result of this relevancy theme, questions about serving special population groups were asked. These questions were: How are we serving the handicapped and disadvantaged? What are their rights when it comes to educational planning and program offerings?

The course of the decade of the 1970's was charted as a result of the experiences of the 1960's. The time was right for specific pieces of legislation -- Public Law 93-112 (Rehabilitation Act of 1973); Public Law 94-142 (Education for All Handicapped Children Act of 1975); Public Law 94-482 (Educational Amendments of 1976); Public Law 95-93 (Youth Employment and Development Projects Act of 1977) -- that would provide the mechanisms through which handicapped and disadvantaged persons could be served and trained. Because of these new social and educational commitments, the 1970's became known as the "total programming decade."

This "total programming decade" brought to the field of education terms like mainstreaming, least restrictive environment, deinstitutionalization, and normalization. All of these terms have as a focus the delivery of services to special population groups.

By process of definition, the 1980's have to be declared the "Implementation Decade." All of the pieces of legislation, theories, and plans must be put in place in order for the targeted groups to be served.

The movement of equality of opportunity requires that human service agencies cooperate together as they develop their continuum of services. Three of the most involved fields in providing education and service to handicapped and disadvantaged individuals are special education, vocational education, and vocational rehabilitation. These three fields became intertwined with each other as a result of philosophical changes in service to and for handicapped and disadvantaged individuals and federal legislation.

Special education through P.L. 94-142 started developing and implementing Individual Educational Plans (IEP's). These IEP's are very prescriptive and clearly outline where the student should be progressing on the education continuum. A critical part of the IEP is a strategy for training the individual for a post high school experience, be it work or further training. For many handicapped students, vocational training was called for, and as a result, special education started becoming very involved in vocational training with only limited experience upon which to call.

In the meantime, vocational education via P.L. 94-482 was setting aside 30% of its federal dollars to serve the handicapped (10%) and disadvantaged (20%). Vocational education personnel were receiving handicapped students into their programs, both mainstreamed and separate programs. These vocational instructors had little or no training in working with special needs youth. Many of the placements were inappropriate or incorrect. As a result, there was confusion and frustration by instructors and students as each struggled to find out how they could survive in their educational settings. Initially it was a very difficult time for all.

Vocational rehabilitation was receiving much attention through P.L. 93-112 and the various provisions within the law, such as section 504. This section makes it illegal to discriminate against the hiring of or admission into a vocational education program of qualified individuals on the basis of their handicapping condition.

What was occurring was that a number of educational and societal changes were being made independent of each other, but as time went by, they slowly started to intertwine with each other in terms of a continuum of services. This intertwining brought about a number of personnel training needs in all three of the fields, but especially in special and vocational education.

The training needs for special education were as follows:

1. Development of appropriate IEP vocational components.
2. Vocational assessment of student interests, abilities, and aptitudes.
3. Proper placement of handicapped students in vocational settings.
4. Placement of students into jobs in the community.
5. Selection of appropriate vocational instructional materials.

The training needs for vocational education were as follows:

1. Working with disadvantaged and handicapped students.
2. Vocational assessment of student interests, abilities, and aptitudes.
3. Proper placement of handicapped and disadvantaged students in vocational settings.
4. Placement of students into jobs in the community.
5. Selection of appropriate vocational instructional materials.

The training needs for vocational rehabilitation were as follows:

1. Integrating into the educational mold.
2. Translating vocational assessment results into educational placements.
3. Developing a role for vocational evaluation in school settings.

4. Utilizing job laboratories for student placement.
5. Understanding the continuum of services for handicapped students.

These three lists resulted in a scramble to train the involved personnel in order to better meet the needs of the students they were serving. This scramble resulted in a lot of personnel development programs being developed, but, as they were being developed and implemented, "turfism" started rearing it's ugly head. This turfism was translated into a series of skirmishes over where students could be counted for funding purposes. The federal programs were intended to supplement the local school districts efforts, not supplant them. The students then became pawns in a head-hunting game by various programs. Each program wanted to count the students as theirs, so they could get additional federal funds. Once the initial implementation phase of the new pieces of legislation (P.L. 94-142 and P.L. 94-482) passed, and the trouble spots in terms of funding were ironed out, then cooperative agreements were drawn up by the local districts between special and vocational education. These cooperative agreements illustrated funding patterns, responsibility of personnel, and administrative functions.

There still remained some philosophical issues that had to be worked out between the two fields in regard to methods of delivery of services. Special education felt it could best offer vocational training within the structure in which it operated. Vocational education felt since it was in the business of training people for work it could best train these students. Then on the other hand, vocational education wasn't sure that it was it's job to train handicapped students. Once the dust settled, mutual respect for each other's professional expertise was developed, and a team approach was developed to serve these students. Vocational teachers started serving on IEP Child Study Teams, assisted in making student placement, and offered skill training. Special education assisted vocational teachers as resources for instructional techniques, placement, transfer of academic skills to vocational settings, and the development of good employee skills.

At this point, turfism of a higher level again surfaced -- this time concerning teaching credentials. Vocational teachers were teaching handicapped students and they were not certified special education teachers. Special education teachers were teaching vocational subjects, and they were not certified vocational teachers.

Part of this problem again rested with the manner of funding these programs. The special education dollars required a certified special education teacher, if the dollars were going to flow into the local district. This same situation held true for the vocational dollars. There had to be a certified vocational instructor involved in the instruction.

A number of states (examples: Nebraska, Washington, Illinois, Idaho, Missouri) sought to remedy this situation through cross-training and secondary endorsements. They created local district teams composed of special and vocational educators. These teams were trained in joint programming utilizing the expertise from the two fields to develop mutually beneficial educational strategies. This cross-training did not solve the credential problems, but it gave credibility to what the instructors from the two fields were doing.

Another strategy for solving the credential problem was to offer a secondary or add-on endorsement for special and vocational teachers. The special and vocational teachers would take a series of basic courses in the area of vocational training for handicapped individuals. Then, if they were from special education, they would take additional vocational training. For the vocational teachers the opposite was true; they took additional special education course work.

This secondary endorsement training did not make them dual certified, but it did endorse them to work in parts of each other's program. Progress was being made in the offering of vocational training for special populations, but much remained to be done, both in terms of curriculum and personnel.

With any new movement there are stages that it goes through and vocational training for handicapped individuals was no exception. The initial phase of placing students in vocational programs was over. Demands were being made on teachers to make sure the placement met the students' needs, were proper, and were leading to gainful employment. These demands brought about a tremendous interest and growth in vocational evaluation on the secondary school level. The teachers and counselors were in desperate need of information about the needs, interests, and aptitudes of their students. Generally they had paper and pencil aptitude surveys and the results of an occasional manipulative device.

Outside the field of education, vocational rehabilitation was developing and refining vocational evaluation to an even higher level of sophistication, but these services and data were not readily available to school systems. To meet their needs, school systems started conducting vocational evaluations with the resources they had, both in terms of personnel and devices.

The school personnel were trained to conduct vocational evaluations by taking a graduate course in vocational evaluation, taking training sessions offered by sellers of vocational evaluation devices, or attending a training session offered by an institution of higher learning; such as the University of Wisconsin-Stout's training, sessions offered by the Research and Training Center #22. All three of these methods served to orientate school personnel to vocational evaluation, but in no way did it make them vocational evaluators. The problem of how and where to secure well trained vocational evaluators for schools was created and currently the three fields are working to resolve this problem in some logical manner.

## Possible Solutions

The following discussion will set forth a number of possible solutions to this dilemma of how to secure the "appropriately" certificated personnel to conduct vocational evaluations. The solutions are meant only for discussion, as none of them are to be perceived as total solutions but only as solutions that are currently being tried.

### Grow Your Own

This solution is the most commonly used. A district selects a certified teacher that is interested in vocational evaluation and sends the individual through a series of short term training programs. The training is taken where it can be best secured based upon financial resources. This method results in a certified teacher, which is critical to the district when they undergo accreditation, and a person that is interested in vocational education. This method works if the interest of the selected teacher is strong enough to do a lot of personal study and training to develop the competency required of a vocational evaluator. This solution to the problem has worked well in a number of cases, but it all depends on how much the teacher cares.

### Make Me A Teacher

Another strategy that has been employed has been to hire a vocational evaluator and then require them to become certified as a teacher. This method has made mixed results. For example, a vocational evaluator was hired with the stipulation that she obtain teacher certification within three years. Using a local college's course catalog, she discovered that her easiest way to be a teacher was to take courses in history. She completed the requirements and is now a certified history teacher doing vocational evaluation full time. This appears to be unfair to the vocational evaluator, a professional in her own right and in the field of history education, because she doesn't want to have anything to do with history at all even though she is a certified history teacher.

### Developing Respect

One solution would be to get educational agencies and school districts to recognize vocational evaluators as professionals in their own right. They are recognized as such by the field of vocational rehabilitation, why not education? Vocational evaluators would be working parallel to teachers and counselors in terms of evaluations and referrals. A precedent for inclusion of vocational evaluators within school settings, not as certified teachers, but as certified evaluators, comes from speech pathologists. Many of these individuals are certified pathologists, but not teachers. They practice their profession of assisting students without the need for being a certified teacher.

The source of certification for vocational evaluators could come from the Commission for the Certification of Work Adjustment and Vocational Evaluators (CCWAVES). This commission has established a rigid set of criteria and testing in order for vocational evaluators to be certified. The certification is for a five (5) year period and when renewal is needed, record of continued education (CEU's) and other professional improvement must be supplied. This certification much parallels the teacher certification process.

### State Certification

State Departments of Education are generally the certification officers for teachers. These departments and the rules under which they operate are the entities that must be dealt with. School officials and vocational rehabilitation professionals should talk with these state officials in order for all individuals to understand the intricacies of certification. Unless this critical step is taken, teachers will continue to conduct vocational evaluations with limited expertise, and vocational evaluators will be excluded due to a lack of teaching credentials. A joint agreement can be developed between the involved fields to resolve the problem or at least to set up a plan where the problem can be worked through.

### National Position

A critical question must be asked at this point. Is there a need for certified vocational evaluators in school settings? Schools are currently getting along with the level of trained personnel that they have, whether or not they are adequately prepared as viewed by the rehabilitation field. So what is the concern? The people most concerned about the certification of vocational evaluators are those working in the area of vocational evaluation, both in education and rehabilitation. Unless national associations such as the National Rehabilitation Association (NRA), Council for Exceptional Children (CEC), Division on Career Development (DCD), Vocational Evaluation and Work Adjustment Association (VEWAA), American Vocational Association (AVA), and the National Association of Vocational Education Special Needs Personnel (NAVESNP) join together to develop some joint positions on personnel, no progress is going to be made. The afore-mentioned associations have positions on vocational evaluation, but they have not addressed to any great depth personnel requirements. Thus, by addressing this concern and then advertising it, proper training can be specified. Then school districts will have an idea of what kind of training their vocational evaluators should have.

A benefit of cooperative activity between these associations would be the development of a continuum of vocational evaluation services so that the various service providers would understand how each fits into the model and what they are to do. This would greatly facilitate the referral process for handicapped individuals from seventh grade through adulthood.

## Conclusion

This discussion has traced the personnel problems created as a result of the implementation of federal legislation providing access to training and employment for handicapped individuals. Using this information, national associations involved with vocational evaluation must join together to develop personnel preparation recommendations in order to have well trained vocational evaluators conducting vocational evaluations. If they do not, there will never by any specific training outlined for vocational evaluators in educational settings and the certification problem will be perpetuated. If they do, vocational evaluators will have the opportunity to acquire the competencies necessary to conduct vocational evaluations that will facilitate better placement and service to handicapped individuals.

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# MARKETING VOCATIONAL EVALUATION

**ANN WILLIAMSON**

**ABSTRACT:** This paper presentation discusses basic market information gathering for the field of vocational evaluation. Starting with a discussion of service customers, the paper reviews the planning of marketing, assessing competition, developing advertising, sales promotion, and market research.

M. Chairman, attendees.

Congratulations! It is truly an honor to speak with representatives of a field that is fast becoming the newest of the professions. Vocational evaluation finally will be an occupation without the question, "But what is it that you do?"

Up until recently I did not realize the impact you have been having with handicapped populations for many years. From my position in the advertising/lithographic industry, I thought everybody merely decided what they wanted for vocation, and went around asking potential employers or placement agencies until they were hired. But now that I am with you, I realize the tremendous science--and information--that is available in the matter of job selection.

## Defining Your Service

Let us get down to basics. Before you begin planning your marketing, you need to satisfy two steps. Let us begin our exploration on marketing vocational evaluation with the first marketing principle: define your product. What is the service you want to market?

You have formed an excellent reputation in assisting handicapped people to realize their occupational potential. Since the 1950's there has been more or less full employment opportunities in the U.S. for the able-bodied, so you have seen to it that people who have some disability could find a place alongside the able person. To do this you tested, measured, evaluated and proved that disabilities do not necessarily relegate a person to non-existence.

This expertise was well-developed when industry and insurance began to cry out for your help in Worker's Comp cases. Now state and federal government realize that you hold the science for releasing or retaining disability cases in the matter of truly-needy relief rolls. But this is not the end of your booming expansion.

The U.S. now has a tremendous displaced worker problem--added to the able-bodied, hard-core unemployed--an enormous population with little awareness of your well-developed methods. Many of our agencies are now expanding to include these unfortunates. There are no physical or mental handicaps in this group--just the monumental handicap of trying to figure out the best vocation given the person's makeup.

But your future does not stop there. Have you heard about the tens of millions of employed persons who are actively searching for "something better" to do? They have no one to turn to for the quality of vocational evaluation that could lead to better-informed job selection.

Define your service before you even think about marketing. Look at your choices by type of population and source of business:

Physically/Mentally handicapped persons--usually come to you from government or private sources or families of individuals.

Worker's Compensation cases--referred by insurance companies and lawyers.

Disability cases--referred by judicial and medical professions or individuals themselves.

Displaced workers--referred by industry, union and government.

Hard-core unemployed--referred by government and JTPA.

Chemical abuse clients--referred by medical professionals and penal groups.

Ex-offenders--referred by prison system.

Distressed employed--referred by individuals themselves, or employment services.

Young people, not yet employed--referred by high schools, and colleges.

While many of you now handle cases from several of these populations, your expansion goals are moving slowly, and for good reason. Can you really handle a 50-year-old who's lost his life job at the same time as a mentally-retarded youth? Can you mix severely-disabled former workers with alcoholic rehabilitation clients?

How can you express what you do to each of these sources for more business? The words you use to explain your ex-offender evaluation program to the prison system must be different from the words you use to families of the physically-handicapped. Your appeal to the legal and medical profession for Worker's Comp cases must be different from your appeal to PIC councils.

I assure you that you cannot be everything to everybody. You cannot sit under one banner and the same message, and hope to attract more of each of these problem areas. You will not be credible. Even though you are incredibly competent for all areas.

The marketing professional will tell you to go after the largest market just for percentages' sake. I'm not going to tell you that, because you must find your own niche, your own specialty based on personal expertise and preferences. All I can do is warn you that temptation for expanding into various markets at the same time could do you in. It may appear to be easy for you now to define your service, but future expansion areas are closer than you may imagine.

The other point to satisfy--along with defining your "product" or service--is you must be aware of your rate of production. You cannot be comfortable with your selling prices without knowing how much service you can offer per given time period. The fact of the matter is whether you are appealing for funding or establishing a price for private caseloads, you must know your level of efficiency and why you work at that rate of speed.

Your rate of production depends both on attitude and on the tools you use. As all of you know, some agencies press for a maximum turnaround, others for a more slow-paced, thorough evaluation. In either case, your marketing plan must be able to defend what your attitude is. In all your cases, however, there is pressure for more efficiency.

New evaluation tools on the market are responding to this change in your field. Historically, you were able to spend a great deal of time with a client; now there simply is not enough money available in the U.S. economy to allow leisure in production. Your major tools must be geared to evaluate the majority of your clients in less time than you were allowed to spend in the past. Other evaluation methods should remain available for you to use with those clients who are more difficult to assess or who present greater problems for evaluation.

I think our company--Career Evaluation Systems, Inc.--has now experienced this pressure for more efficient evaluation tools from both ends. When our human factor testing and computerized scoring method first came out 7 years ago, we were criticized for being too fast; now there is pressure from you evaluators for us to speed up our systems even more. Seven years ago a 5 1/2-hour test battery plus computer scoring by mail was the latest thing. Now that we have a 3 1/2-hour test and instant telecommunication scoring we find ourselves in a marketing dilemma of competing with a 1/2-hour evaluation method!

Do not get me wrong. I am not on the side of faster is better. I am merely explaining this as a concept to keep in mind in justifying your rate of production. My company has taken a stand that 3 1/2 hours of tests are necessary for a quality evaluation tool, and that telecommunication scoring will save evaluation funds in the long run over producing changeable software packages. With this as full knowledge, we will market our product and service no matter what the faster methods are trying to do. Around the office we have a saying that we have really become the Cadillac of evaluation systems, but now we are priced like a Chevy.

This is the kind of knowledge you must have before you begin your marketing. Define your service and be comfortable with your rate of production.

## The Aspects of Marketing

Now we are ready to talk about marketing. Before we go another step, though, can any of you remember who a janitor was? He (it was always he) kept the fire stoked in the furnace, shoveled coal, could fix anything--electrical, plumbing, carpentry, your car--and kept the premises in good order. he was either very friendly or very grumpy, but there was no question about who the janitor was and what his jobs were.

Today janitors are called building engineers. They rarely do any of the above tasks themselves, though they are always busy explaining why something happened as it did and promise to "have a man over right away to fix it." They are always polite and politically minded, and often can be mistaken for the administrator.

Do not tell anyone, but "marketing" is to "building engineer" as "selling" is to "janitor." Do not let the title of marketing get out of hand; what you are trying to do is sell. You want to interest people in spending their money on your program. What you do in the name of marketing shouldn't keep you from actually getting the selling done.

Perhaps we should define four separate aspects of marketing. To name them, there is (1) the planning stage, (2) assessing the competition, (3) the advertising stage, and finally (4) sales followup.

### The Planning Stage

Planning your marketing attack is crucial. We have already defined your service and made you comfortable with your rate of production. Now we need to pinpoint who you wish to sell your service to. It's called "identifying your markets."

If you are in a position to apply for community or government funding, either you already have a tried and true method of attracting these funds or go out and hire an expert. This is a highly stylized method of selling your services and rarely works in amateurs' hands.

Another increasingly popular source for funding is appealing directly to industry. The impetus in federal government programs now is to encourage business to support local services such as yours. The important point to remember in approaching business and industry, however, is that you must thoroughly describe how giving money to you will benefit them. Do not be critical of this attitude; they have limited funds for community service, and need to justify that no money is "wasted." An area where they surely would benefit is your expertise in identifying particular jobs for people who would otherwise end up on relief rolls or at extensive worker's compensation. Businesses (and for that matter all taxpayers) want to see the unnecessary handouts to individuals decrease. Other areas where business will benefit should be based on particulars in your community.

For those of you who service the community on an individual basis by direct counseling fees, you are into what is called "consumer marketing." You have to plan your marketing attack through general public media. This approach includes signing up for local radio & TV talk shows, getting articles about your organization in newspapers, as well as paid advertising campaigns which we will get into later.

All these different market approaches, however, need one additive you may not know about. The classic example in marketing textbooks is the liquid entertainment field. Let's say you want to introduce a new beer on the market. First you hire a dozen or so shills. These people walk into assigned bars, and ask for the beer that no one knows about yet. They talk about the virtues of the new product, sometimes refuse any alternative drinks that are offered, and walk out. This goes on for a period of time, until the beer distributor calls on the bar. Lo and behold, he has this great beer for sale, and the bartender says "I have had a lot of people ask me for that lately--it must be really popular--yes, I will take some cases."

This is called "creating consumer demand." If your marketing target recognizes your name and service when you make contact, you have a much better chance of a sale. Perhaps you could use the "shill" approach--maybe done with phone calls to your identified markets--or other methods that call for creating demand, such as requesting your satisfied clients to talk about your organization. Getting your name generally recognized in your market makes selling a lot easier and less expensive.

The final step in planning is to establish a budget for your marketing. Naturally you don't have many dollars--no one does. But you have to spend some money to attract business, and preparing a budget is important. There are two rules of thumb you can go by: (1) for every 100 contacts you make, your marketing is doing well to attract 10 inquiries, not all of whom will buy your services; and (2) for every case you handle, allow about 20% of the price you charge for your marketing budget. Later we will explore how to use these funds wisely.

## Assessing the Competition

Do not forget the competition. Establish, first, how you're different from your competitors. Make a T-chart. List what you do on one side of the chart, and what your competitors do on the other side. If you do not know what your competition does or how they charge, find out. Even if the facts are hard to take--even if they are cheaper and better than you--you must know your competition before you can plan your attack.

This is where the creativity begins. Let me give you an example. Computer scoring of tests in our evaluation system is done by telecommunications with personal computers. We recognized that some of our competitors sell software packages to do on-site computer scoring, and we were getting criticism from potential users about our scoring methods. There was only one thing for us to do; make telecommunications the more attractive approach, putting the competition on the defensive. Because we truly believed that our method was superior, we only needed to state why.

Since we promise computer system updates, never with an additional charge (and changes are imperative fairly often in computer software!), we raised the question in the buyer's mind of how much he's going to be spending with competition every time their software is revised. We also made the statement that we would not allow evaluators to use something of ours that was outdated simply because there's no money to buy the updates. Plus we also gave the computer's modem software free of charge with our systems, so the computer user has telecommunication access to all sorts of other data bases. In other words, we launched an offensive--because we were sure the buyer would be better off financially--to counter a trend which could have made us appear to be on the defensive.

If your competition is cheaper, state how your service is more thorough and gives superior results. If they are faster, state how much more service you offer. Use what you believe in about your service, and make your competition defend themselves against your criteria.

### The Advertising Stage

Now we are ready to spend those budget dollars. The advertising stage is where you decide what media will be best--both to reach your markets successfully and to stretch your available dollars. Briefly, advertising media can be listed in order of most expensive first: television commercials, radio spots, billboards, printed display advertising (newspapers, magazines), direct mail, bulk pamphlet delivery to individual-handout locations, and on-site handout materials.

Do not ever be without the last media. On-site handout materials are the least expensive advertising materials and a very effective way to advertise. You are in touch with people who were interested enough to be at your location. Give them two copies--one to pass along to friends.

If you have not already, develop at least one central printed piece of literature for yourselves--such as a pamphlet. If you have the funds, go to a small advertising agency which will write, design and have printed the number of copies you need. If you do not have money for the price they quote you, writing the copy yourselves will save those extra dollars. Be sure to describe your history, what your services are, and who they should contact for more information. Do not include prices or schedules, because these may change before you run out of copies. The main thing is to have the design and printing done very well. Everyone you want to contact is accustomed to beautifully executed printing--most of the junk mail now is superb! The best quality at a reasonable price is available to you at a medium-size printer who also has a typesetting department. They will work within the budget figure you give them, but plan to spend at least $.25 each in the 2-3,000 copies quantity.

This piece of literature is multi-purpose, for it can be used in direct mail campaigns as well as for handouts. Whether you are a funded or a fee-based organization, direct mail should be one of your advertising choices. Company managers indicate that direct mail advertising provides their purchasing initiative. Individuals receiving direct mail with an easy response form are more apt to at least inquire about you than if they see a telephone number in a short TV ad.

Direct mail, however, comes in "campaigns," not as a one-shot effort. Plan to use your mailing list at least three times within a four-month period for the optimum results, with a different letter but same theme each time. Always include some kind of return mail response card. While mailing lists are available for purchase, you probably are better off developing your own list; you can be more specific.

If you are a fee-based organization, begin to save your pennies for display advertising. Your least expensive display would be in your local newspaper or community ad booklets for special events. For magazine, billboard, radio and TV display ads, you will need an advertising agency's services. As a fee-based service, you are as much a consumer-oriented group as your local hospital or community college. Find out how they advertise in your area. Sometimes the public relations manager of these institutions can give you extra help if you ask.

For the advertising stage of marketing, however, there is one overpowering concern no matter what media you choose: how you say your message. If you do not describe your services so they are understood, you will have only a small result per dollar spent. Frankly, when I came into your field, it took me nearly a year to understand the vocabulary you use. I read all sorts of advertising literature, newsletters and magazines-only to find 40,000 acronyms, shortened words and initials used in place of real words. The computer industry has nothing over on you!

You should not use your field vocabulary when you are advertising. You must speak the language of the markets you are trying to attract. Most do not know what you are selling for "voc rehab, EMR, work hardening, extended shelter employment." Instead of using your usual terminology and trying to define it, state your services in terms of and on the level of newspapers (or what your 13-year-old brother's friends would understand).

You will find this very difficult to do, because "voc rehab" means voc rehab or vocational rehabilitation to you--not "we assist handicapped people to discover potential jobs they can hold." Even when you are advertising to people who should know your field--such as state vocational counselors--you will have more impact using every-day terminology.

I should add that you are not alone in this vocabulary problem. Every occupational field has its shorthand that means little or nothing to the outside world. That is why there is an advertising field--to interpret what the in-groups want to say to outsiders so products and services can be sold. If you do not have the budget for an interpreter, practice experimenting with words to come up with understandable messages for your different markets.

My company recently went through this very routine. In speaking with community colleges about our evaluation system designed for use by the general public, we said we measured aptitudes. The messages we got in response were very negative--to the effect that aptitude tests are no good. We had been having trouble with the term "aptitude" anyway in the voc rehab field, because we measure and use aptitudes quite differently than other voc rehab methods. So we decided now was the time to clear away this confusion altogether.

We decided to return to the exact phraseology of the science our systems are based on: human factor testing. We provide a human factor profile of an individual and link that profile directly to the DOT's Data-People-Things codes for potential vocations. May I say we now have a winner. The general public which was turned off by a single word now listens and agrees with the principles of your methods. This is the kind of vocabulary discovery routine you are going to find rewarding.

**Sales Followup**

We are closing in, now, on the final step in marketing. Closing is the exact term to use. Nothing is sold until "the sale is closed"--until you have their promise or the money for your services. You can market and advertise and express yourself well until you are blue in the face, but you will not have positive results without sales followup.

The routine is very simple: (1) keep files of the advertising you send to every person, (2) talk (by phone or personally) to everyone who responds to your advertising, (3) talk again and again until the sale is made, and (4) advertise later to people who haven't yet responded.

I already know your reaction. "But I am not a salesperson! I do not know how to talk people into buying!" well, in just a few moments, I am going to convince you otherwise.

First, the traditional sales approach is no longer effective. You will not be able to push someone to buy your service in the manner you imagine sales is done. Think about it for a moment. Chances are that you buy only from people who can help you out with their product or service. Chances are that you avoid the kind of sales approach that sounds like a pitch. Most people today buy only when they believe their life will be better off because of the purchase. You are already selling all day long. Your job is helping clients. You establish a rapport with them, find out their needs, and then convince them that your service is making their lives better. Use this same approach in sales followup. Establish a rapport by discussing the buyer's needs, talk about how you can help them by using your services, convince them from examples of how you have helped others in their position.

Let us take a really tough example: getting a larger caseload from a DVR counselor. Assume you have laid all the groundwork I have talked about so far. Follow up by calling the counselor--just to find out what he/she feels about the evaluations you have been sending. Are they what is wanted? Are your reports easy to understand? What could you do to help out more? What are his/her problems? From the conversation, you may find making a slight adjustment will give you more cases, or you may be able to clarify something in his/her mind. But offering to help today, and when you call again later--and again later on--will convince the counselor that he/she's going to be better off sending you more cases. This is sales followup.

**Market Research**

I would be remiss in closing without mentioning there is a very technical area to marketing called market research. To be truthful about marketing--or building engineers--technical expertise in complex relationships is the difference between that and selling--or a janitor's position. My marketing research, however, indicated you needed more emphasis on the practical aspects of marketing today.

If you have funds to work with, you would profit by a marketing expert's survey and report on your organization's present and future position in the community. It probably would not be fruitful for you to try this yourselves. There are some general trends in marketing vocational evaluation, however, you should be aware of.

The world economy has forced the U.S. into a different role in industrial growth and productivity rates. We no longer dominate the world's economy and are losing our former industrial leadership. This means we will be undergoing significant changes in occupational fields as we are forced to move into new enterprises, and an entirely new dimension will be given to the term "vocational rehabilitation."

Since 85-90% of the U.S. economy's product is paid out in the form of wages, more governmental attention and resources will be afforded to displaced workers, to get them back into income-producing, taxpaying situations, than will be given to persons who are not able-bodied. Therefore, services to the handicapped in vocational rehabilitation will have to be funded more from private sources than government.

Vocational evaluators will be trained to serve the general public, for present placement or personnel services do not have the expertise to reliably advise changing careers. Due to the mass of people involved in a career predicament, the professional will be given less time per client with additional demands for greater reliability in satisfactory job prediction.

You must stay aware of the changes around you and be prepared to alter your marketing emphasis to satisfy new needs. There is a great future in vocational evaluation, but beware of how to appeal to your emerging markets! You may find new markets do not want to be "evaluated." Perhaps you will become "vocational match-makers" instead!

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# NORMS, RELIABILITY AND VALIDITY IN COMMERCIAL VOCATIONAL EVALUATION SYSTEMS: A CRITICAL REVIEW

KARL F. BOTTERBUSCH

**ABSTRACT:** Dr. Botterbusch espouses the belief that work samples are very useful tools for the assessment of disabled persons and others. He states that they have a future, however, some problems still need to be addressed. First, this paper examines the general lack of research on the bulk of available work samples. Norms, reliability, and validity are areas where research needs to be performed. Further, the paper examines why so little research exists and how this state of affairs can be changed.

As most of you know, I have been writing about, studying, and developing audiovisual materials on the various commercial systems since joining the staff of the Materials Development Center (MDC) in 1972. Prior to that time I was employed by the U.S. Department of Labor; one of my major duties was to conduct a series of research studies on the Philadelphia JEVS. I entered vocational rehabilitation and vocational evaluation partly as a result of my work with the JEVS system. At the time I joined MDC and Stout one of my goals was to be able to link the obvious advantages of work samples with the empirical rigor of psychometric theory and practice. Unfortunately, I have not been able to accomplish this; in my judgment neither has anyone else. With a few notable exceptions, research with work samples has been considered more of a public relations matter than a felt need to provide professionals with tools of known usefulness of helping disabled persons.

Work sample systems were initially developed using federal money (e.g., Rehabilitation Services Administration for the TOWER and Manpower Administration for the JEVS) to produce a practical replacement for psychological tests. I strongly believe this was a reaction against psychological testing practices that simply were not valid for many disadvantaged and disabled persons. In the late 1960's and early and middle 1970's, work samples were seen as a cure for all assessment problems: clients liked them because they were more interesting than tests, professionals were satisfied because they were not tests and gave at least the appearance of reality. At that time some of the leaders in the field of vocational evaluation were openly hostile to any research. Work samples were seen as the way to assess clients without research, and without having to critically assess the shortcomings of an emerging profession.

My own opinion is that work samples have a future and are very useful tools for the assessment of disabled persons and many other persons as well. However, the time has come to begin to solve some of the problems of overenthusiastic response and inadequate research.

### A General Lack of Research

Spergel (1970) reviewed the vocational evaluation literature to 1970. He assembled 612 separate listings in vocational rehabilitation; 204 of these dealt with vocational evaluation. Of these only 58 or about 10% dealt even remotely with research. The only significant study mentioned was the original JEVS (1968) "Signposts" study. It is now 1984 and my review of the research literature on work samples forced me to the same conclusions--there is a definite lack of data when dealing with work samples. Evidence for this conclusion is presented later in a review of the literature in norms, reliability, and validity for commercial vocational evaluation systems.

#### Norms

Norms are used to compare a client's performance with the performance of one or more groups. Norms are usually classified according to their source; the most often cited sources are: client, general population, staff, training or school norms, predetermined time study standards, and employed worker norms. A minor controversy has been whether client norms are relevant. Some persons believe that competitive standards or norms are unfair, while others contend that as long as the goal of vocational rehabilitation is competitive job placement, only employed worker and/or industrial standards should be used. The CARF Vocational Evaluation Standards (Sax, 1981) contain the following standard on norms: "c. competitive norms or industrial standards should be established and used." To this VEWAA initiated standard, I would like to add that if competitive norms are used the following information should be available:

1. Complete description of the sample including: number of subjects (sample sizes should be large enough to permit statistical treatments of data and to cover the full-range of ability expected to take the work sample); mean, standard deviation, median and range of ages, years of education, and I.Q.; percent male and female; percent of each type of disability; and the dates and location of testing.
2. A clear description of the procedures used to obtain all data; these should be precise enough that the study could be repeated.
3. A full statistical treatment of the results: means, standard deviations, ranges, medians, semi-quartile ranges and estimates of skewness.
4. If industrial standards are used, the above three standards do not apply. Descriptions of industrial standards should contain: a description of the method used, with references, a brief description of the person(s) or organization performing the study. In addition, all standards should be converted to minutes, etc. for ease in use.

I attempted to apply the VEWAA-CARF standard and the above criteria to the description of the norms for 15 systems described in A Comparison of Commercial Vocational Systems (Botterbusch, 1980). The following work sample systems met most of either the psychometric and/or industrial standards:

1. McCarron-Dial--Manual and research publications contain pertinent empirical and statistical characteristics of the various norm groups. Norms are available on various disabled samples.
2. Valpar Component Work Samples--Method-Times-Measurement (MTM) standards and employed workers norms are available. Worker norms

are adequately described, but sample sizes are only 50.

3. Vocational Evaluation System (Singer)--Uses employed worker norms and MTM standards. Samples described adequately.
4. Vocational Information and Evaluation Work Samples (VIEWS)--This system has MODAPTS predetermined time standards.
5. Wide Range Employability Sample Test (WREST)--Norms are available on employed workers with adequately defined samples.

Another aspect is the development of local norms. Some work sample developers encourage the development of local norms; either because they really believe in their value or as an attempt to shift the burden of development costs to the purchaser. Local norms for the JEVS were presented in two separate articles. Muse and Haines (1981) and Flenniken (1975) found differences between the JEVS published norms and locally developed norms and concluded that published norms are not appropriate for all groups. In another article, Flenniken (1974) noted the skewness of the JEVS norms for many work samples. Although he apparently attributes skewness to the scoring methods and cutoffs, it must be remembered that it is not too uncommon to find skewed distributions in tests of specific aptitudes. My hunch is that these skewed distributions are an acceptable sample of several traits that are in reality skewed.

**Reliability**

The most basic definition of reliability is consistency. We must ask: "If the work sample were to be given this afternoon, tomorrow, or next week, would the client score the same or have relatively the same score within the group?" (Botterbusch, 1981). Reliability is important for both practical and statistical reasons. If a person's performance is inconsistent or of unknown consistency, we have no way of knowing if the client's performance would be different at a different time. In psychometric theory the upper limits of validity are determined by the reliability of the measuring instrument (Guilford, 1954). This does not mean that reliable instruments are valid; it means that an instrument must first be reliable before it can be valid.

In work samples the most common and most practical method of determining reliability is by test-retest measurement. The work sample is administered twice at varying times and the scores on both administrations are correlated. There have been few studies of work sample reliability separate from those reported in their respective manuals. An inherent problem with work samples is their lack of consistency between administrations; even the best designed parts wear, evaluators are not consistent, materials differ from administration to administration, and environmental conditions vary. Because of these factors, one cannot expect work samples to have the same reliabilities that a well-developed psychological test like the GATB or WAIS has. (An aside--in the 1940's and early 1950's military psychologists did much experimentation with work sample techniques and gave up because they could never get the instruments to a satisfactory level of reliability prior to validation studies.)

In reading a work sample manual to decide if it has adequate reliability the user must ask two questions: (1) does the manual contain complete description of the methods used in the study; and (2) how high are the reliability coefficients for the individual work sample or system? To answer the first question, carefully read the method of the the study and find out if the number of subjects was adequate; if the methods made common sense; and if you could repeat the study in your evaluation unit without additional information. The second question then must be asked "how reliable must a work sample be before it is of practical use?" My personal judgment is that it should have a delayed test-retest reliability of at least .70; this only accounts for about half of the total variance. There is one more consideration; some reported reliabilities have been suspiciously high. Test-retest reliabilities usually do not approach .95 or higher.

Using the criterion of at least .70 for test-retest coefficients and complete explanation of the method, I reviewed A Comparison of Vocational Evaluation Systems and concluded that the following work sample systems have adequate reliability:

1. Career Evaluation Systems--Test-retest reliabilities after four weeks ranged from .72 to .95.
2. McCarron-Dial--Most data used test-retest methods and reported correlations in the high .80's and low .90's.
3. Micro-TOWER--Using alternate forms, internal consistency and test-retest methods, coefficients ranged from .74 to .94.
4. Vocational Evaluation System (Singer)--Cohen and Drugo (1976) reported test-retest reliability coefficients of .61 to .71.
5. Wide Range Employability Sample Test (WREST)--Test-retest coefficients for employed workers over a three month period were in the low .90's.

## Validity

Validity is the bottom-line for work samples; you can have excellent norms based on working populations with high test-retest reliabilities and, yet, a work sample or system may not be valid. Validity is how well the instrument measures what it is designed to measure. Does the clerical work sample assess the client's performance on a receptionist job? While there are several types of validity, the critical thing is that each type must be related to outside criterion. There are three major methods of establishing validity: content, construct, and empirical.

Content validity involves the development of a test or work sample against a quantifiable standard, such as job analysis or a curriculum outline. Vocational evaluators have traditionally relied on the DOT and job analysis as the basis of validity; they usually have not gone any further than this. Content validation carried out in a rigorous fashion can be very useful. The job-task matrices in the Singer work samples represent a good start in this direction. It appears that most work sample developers assume that if a task can be related to a particular job in the DOT then they need go no further. The four monographs by Robert M. Guion (1979) present a solid basis for the thorough development of the concept of content validity. However, the main concern of this paper is on construct and empirical validity, and especially on empirical validity. Both types require considerable time, effort, and money. It must be made clear that I am not talking about a one shot study. There should be a continuing validation program for each evaluation system by each developer. A review of A Comparison of Commercial Vocational Evaluation Systems and the literature revealed that no evaluation system, except the McCarron-Dial has reported continuing validation studies in the literature; most evaluation systems have totally unknown construct and/or empirical validity.

Several predictive validity studies were reviewed as examples of what can and should be done. Gannaway and Sink (1977) validated 17 Singer work samples against a criterion of job placement. Using 117 subjects, correlations were made between a composite of work sample time and error scores with success on jobs that included the same tasks as in the work samples. All correlations were in the right direction, but small sample sizes precluded any reaching statistical significance.

Two studies dealt with the McCarron-Dial. Dial et al. (1979) attempted to validate the McCarron-Dial against a criterion of program outcome (i.e., day care, work activity center, extended sheltered employment, transitional sheltered employment and community employment). Program levels were predicted by the McCarron-Dial; six months later the actual program placements were matched against predicted levels using chi square techniques and multiple correlations. All results were highly significant. In a study with a similar design, Fortune and Eldredge (1982) correlated piece work rate, work performance rating, vocational program level and residential program level with McCarron-Dial results. All results were significant. Berven and Maki (1979) related performance on the JEVS work samples to the attainment of competitive employment with a sample of 233 DVR clients. They found that seven of the 20 work samples were significantly related to competitive employment. They suggested that these seven might be enough for assessment and, therefore, the entire battery was not needed. However, these were weak relationships and additional research is needed. Perhaps the largest published validation study performed was an attempt to validate TOWER against a criterion of vocational instructor's and workshop supervisor's ratings (ICD, 1967; Yater, 1964). This five year study was conducted in seven facilities using the TOWER. The conclusion was that: "Disregarding detail, the overriding finding of the present study is that very meager relationships have been found to exist between TOWER evaluations and vocational outcomes" (ICD, 1967. p. 44).

There have also been a few construct validation studies that must be mentioned. Backman et al. (1979) correlated Micro-TOWER and GATB scores for 903 clients, mostly young adults. After the intercorrelation matrix was developed, a principal components factor analysis with a varimax rotation was performed. Five factors accounted for 85% of the variance: Clerical perception, motor skills, verbal ability, spatial perception and numerical ability. The conclusion was that Micro-TOWER assesses five general aptitudes. Finally, Jones and Lasiter (1977) compared the mean time and error scores of employed workers to the norms on three Valpar work samples: Multi-level Sorting, Whole Body Range of Motion, and Eye-Hand-Foot Coordination. The result was that the working sample had less times and less errors than non-workers. The authors suggest the use of industrial norms.

My conclusion is that it is a sad state of affairs when one can summarize most of the research done on work sample systems in a few pages. We must ask why and then ask how this situation can be corrected.

## Why There Is Not More Research

This section attempts to answer why there is a lack of research in vocational evaluation systems in general and especially why so many systems have been marketed prior to adequate development. This problem is a joint responsibility of both system developers and purchasers. From the early 1970's to perhaps recently, both of these groups have fallen victim to what I like to call the "mystique of work samples." When we first got serious about serving disabled and/or disadvantaged persons, we soon concluded that many tests were not appropriate or useful for these groups. Work samples offered an attractive alternative. Because they appeared to be job related and related to the DOT, most persons took them on their face validity and on their limited content validity to the DOT. The naive assumption was that since they related to suppositively "real work" nothing more was needed; certainly not the rigorous research that characterized some psychological development. To use E. G. Boring's (1957) word, this was the "Zeitgeist" of the time, and most of us agreed with it.

In addition to this overall consensus, both evaluators and developers wholeheartedly accepted unproven work samples for a variety of reasons. Some of these are listed below; let's start with evaluators.

1. Rapid Growth of the Field--During the 1970's the demand for trained evaluators far exceeded the supply of qualified persons. Supervisors and evaluators attempted to make up for this shortage by turning to technology with semi-trained persons rather than to trust the experience of trained professionals.
2. Desire to be "Scientific"--This is part of the American culture and as a new profession evaluators needed to prove to administrators and other professionals, funding sources, and themselves that they really knew what they were doing. The presence of fancy and often expensive hardware gave the appearance of professionalism that was needed.
3. Poor Consumer Training--For a variety of reasons most evaluators have little knowledge in the technical aspects of work sample development or research. This resulted in not being able to ask meaningful questions about the research and development of work sample systems and to fall victim to written and spoken claims as to their effectiveness. The accurate assessment of a client's vocational capacities should be the main concern of the evaluator; part of this responsibility is to select valid techniques for use in the evaluation unit.

Of course, commercial vocational evaluation system developers must share at least equal responsibility for this state of affairs. There are three reasons why they have not done the preliminary research prior to marketing a system:

1. Desire for a Profit--While the first work sample systems were developed on public money, most of the later ones were developed on a combination of public and private funds, or entirely on private funding. To my knowledge, all present systems must make a profit to survive. Because research costs money and lengthens the time between development and release to the public, there is a desire to cut costs as much as possible, especially if the targeted customers will likely not notice it anyway. The goal of a business is not to make a profit; it is to provide a useful product or service that in turn will be profitable. Somewhere the "useful product or service" was misplaced.
2. Self-Deceit--The first reason assumes a rational decision not to develop a good product because of time and cost considerations. From my personal experiences of working with many developers over the years, I am of the opinion that many really believed that they were developing a good product and did not have to perform research.
3. State of the Art--Most work samples were not thoroughly researched prior to release because it was (and still is) the covertly accepted practice to sell and use instruments that were not ready for market, at least as finished products.

These six are the major reasons why work sample systems have not been properly researched prior to sale; though there may be other reasons that I did not list. The problem is that, for whatever reason, these systems are a part of our daily professional lives. They will not be recalled because of factory defects. My concern is that as the new era of short-time, computer based assessment tools arrives, these new products will repeat the same mistakes of the past and evaluators will purchase them with the same hope and enthusiasm that they purchased other products ten years ago. In the end the client loses.

## What Can Be Done

I would like to offer some solutions to this problem. Any solutions must be realistic and we must realize that a free market place will continue to operate without major outside influences. I do not see any governmental influence providing consumer protection for either evaluators or their clients. I also doubt if any professional organization, such as VEWAA, will take the lead in developing a set of standards as tough as the American Psychological Association's Standards for Educational and Psychological Tests (APA, et al., 1974). Even if standards were developed they would not be enforced. The CARF vocational evaluation standards for work samples are not enforced and there is no reason to think that others would be enforced. The solutions will depend on both users and developers. Evaluators can do the following:

1. Become Knowledgeable--Before purchasing a work sample or any other assessment device, the evaluator should carefully read the manual, ask for technical reports, and subject this information to a critical review. If an evaluator is not knowledgeable in the technical aspects of test and work sample development, he/she should attempt to take a college course in psychometrics or testing. The best way to get developers to improve a product is to stop purchasing it and then to tell the sales representative why.
2. Consider Other Techniques--Work sample systems are not the only methods of evaluation. Before purchasing a work sample system, see if other methods will work just as well and cost less. In the last five years, for example, many psychological tests have been developed or modified for disabled persons. More workshops are having success with job site placement. The evaluator should consider other techniques.
3. Realize That There Are No Easy Answers--Evaluators must realize that they have a very difficult job and that there are no easy answers. We are conditioned to expect instant answers, especially ones offered under the guise of high technology. The reality is that there is no single product that will assess all disabled persons; some will work for some and not for others.
4. Avoid Flash--One of the best selling features of work sample systems is that they use audiovisual and, more recently, computer technology to produce highly interesting and impressionable displays. These look good in the evaluation unit and impress clients and visitors. While technological answers are very useful in some cases, the evaluator should look for content behind the flash. Does that computer administered test really measure some trait more accurately than a standard test or is it just more attractive? It certainly costs more. People in AA have a saying: "keep it simple"; may be we should follow this.
5. Set the Specifications--If it is decided that the evaluation unit needs a new method to assess a particular skill, trait, etc., that unit should set the standards. The guidelines given in Botterbusch (1980) could be followed: consider the community, client population, purpose of evaluation and the use of other techniques deciding if a new evaluation system should be purchased.

Developers of work sample and assessment systems could do the following:

1. Enlightened Self-interest--Quite simply stated, a better product should result in increased sales and increased use. If a company intends to stay in business over the long run, it's chances are increased if they produce a durable product and begin to build a reputation on that product and, hence, on the company name. A solidly developed

product with an ongoing research program is a sound, if long term, investment.

2. Invest in Research--Research must be done as an attempt to improve a product prior to initial sale and over the lifetime of that product. Research must not be confused with advertising and advertising must not replace research. Developers should also realize that validation is not a one-shot study with a small group of subjects in one particular facility. Developers need to establish research programs and to publish whatever the results are in professional journals. They should make provisions for cooperative studies with facilities and universities willing to perform unbiased research. Validation and acceptance will not come overnight.
3. Users Less Naive--Some professionals have been in the field for several years and have seen the rapid ascent and subsequent decline in the popularity of work sample systems. More new persons entering the field are better educated and more able to ask questions about reliability and validity than they once were. One recent and encouraging example of this is the detailed critical analyses of norms for the Valpar 17 (Nicholson, et al., 1984).

In conclusion, consider your clients and act as their advocates. The worst possible case to imagine is a class action suit against a state agency or facility for making vocational decisions on the basis of devices poorly normed, having unknown reliability and unknown validity. What defense could any of us offer?

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# RESEARCH NEED IN VOCATIONAL ASSESSMENT

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**ABSTRACT:** In the course of this paper, a perspective is offered regarding the value, contributions and needs for research on vocational assessment or evaluation. Fundamental professional and research issues are traced from their origins in the 1960s to set the tone for a review of the research priorities which have been addressed in the literature since that time. Following a review of the quantity and quality of research that has been undertaken between 1960 and 1980 is a discussion of some major public policy changes, social trends, technological advancements and population dynamics which can be expected to significantly affect the growth of the discipline and the research that is needed in the coming decades. Finally, a program of research is presented which attemps to maintain a careful balance between the field's need for research that leads to direct solutions for current problems and the field's need for research which continues its development as a discipline.

Throughout the paper certain consistent terminology has been adopted. First, "assessment," "evaluation," "vocational assessment" and "vocational evaluation" are used interchangeably with full recognition of the ongoing debate in the discipline over which term is most appropriate in vocational and rehabilitation settings. Second, the terms "assessment devices" and "evaluation devices" are used to cover the collected technology and instrumentation used in assessment to gather systematic, reliable information on a person's aptitudes, capacities and limitations, achievements, skills, interests and needs. Third, "clientele" and "evaluee" are used to refer to persons being evaluated or assessed.

As one goes about reviewing the literature of this field, frustration, renewal and humble hope are three emotions that arise as one attempts to develop a useful paper on this topic of the role, value and need for research. Frustration because there is so much to cover under the topic, so many different sources that should be checked, reviewed, reacted to, synthesized: Too many choices of where to begin, what to present and how to present it. There are some key works on vocational assessment which need to be read by any who are concerned with this topic. In rehabilitation, some of these are McCray, 1982; Pruitt, 1977, 1983; Dunn, et al., 1976; Bolton, 1972; VEWAA, 1975; Institute on Rehabilitation Services, 1972. From the related disciplines of educational psychology, vocational education, special education and industrial education Petersen, 1981; Petersen et al., 1981; Finch and Impellitteri, 1971 are some examples of resources that we each must reexamine. There is and will continue to be considerable information to be judged and summarized.

A fair amount of transdisciplinary activity has taken place since 1960 to both define and demonstrate the processes, practices and technology used in vocational assessment. In the 1960s, the debates centered on clarifying fundamental issues facing this emerging discipline, on setting forth a coherent philosophy of vocational evaluation (VEWAA, 1975; the Iowa Conference on Vocational and Prevocational Assessment, 1969) and on posing questions about vocational evaluation's utility. By the end of the 1970s we begin to find that a truly noticeable amount of research (see reviews by Berven, 1983; Herbert and Menz, 1981; Fry, various years) had been undertaken which attempted to establish the validity of measurement techniques and to demonstrate the impact of our evaluation practices. During this same time, the technology and processes of vocational evaluation began to be adapted and debated in the related fields of vocational education, industrial education, and guidance and counseling. The 1980s are, again, characterized by adaptation and debate regarding the utility of vocational assessment. Now, though, our colleagues in special education, in the private sector and employers, as they begin initiatives into company sponsored rehabilitation, are the major contenders in these debates and adaptations.

As one tries to develop a perspective from the literature of the past 20 years, one comes to realize that a viable body of research on vocational assessment has begun to develop. Like the physical and social development of an infant, if one traces the disciplines maturation through its literature, we find that muscle is actually beginning to replace the discipline's baby fat. Its cognitive processes are becoming functional as it acquires language fluency: Its vocabulary (terms), speech patterns (use of consistent definitions of processes), syntax (assumptions) and logic (operational definitions) have become understandable and acceptable (according to the standards of research). The creature is beginning to be able to communicate. As muscle (knowledge derived from technically sound research) replaces fatty tissue (i.e., untenable hypotheses and suppositions, folklore is dispelled by empiricism), the discipline begins to make its first unassisted attempts at walking. Motor coordination is still developing (validated and normed), it still stumbles (its technology is still not completely reliable) and it clearly is not ready to dance. But, because the results of research on similar problems of health have been conducted in rehabilitation, education and the private sector, their shared value has led to providing the discipline with a more balanced nutritional program (replicable methods and research which are multi-perspective and lead to self-correction). The discipline is now beginning to be properly nurtured. A new and healthy growth spurt can be expected.

Finally, as one attempts this review, one cannot help but realize an inkling of validation for the discipline and find reminders for the roles there are for research in helping the discipline test and validate itself. As I went back in time in the literature to reexamine the quantity, complexity, origins and history behind the key issues, I could not help but come away with a better appreciation of what the discipline is about, with what it has had to deal, what has been accomplished, what has not been accomplished and what it may never accomplish. In a sense, while one can find renewal and validation for the discipline and ones potential contributions, one cannot but also come away with a sense of urgency. There are still so many questions and positions to be formulated as issues, so many issues to be translated into doable research, so many issues to be readdressed as our national fabric and values change, so many studies to be replicated, and so many new topics and problems which require solutions. In the face of such a vast range of needs, one must remember the "reality testing tenant" of research in the behavioral sciences: Research rarely answers a question in the affirmative for its purpose is to accumulate evidence regarding sides of the issues which surrounds any dynamic phenomena.

### Issues in the Literature

The literature between 1960 and 1980 is instructive in terms of how radically the discipline was moving, the issues which concerned our colleagues, as well as their valuing and priorities for research on evaluation or assessment. The technology used in assessment of disabled persons underwent a radical reevaluation and redevelopment. It was during this period of time, that frustration led theorists and practitioners of evaluation to move away from a total reliance on psychometric models and methods for assessing the impact of disability on the potential of disabled persons. The discipline shifted its energies into development of work sampling as both a theory and an assessment process, into development of reliable methods for conducting situational assessment, into developing commercial, program and disability specific evaluation systems, and into laying the groundwork for many of the computer-based evaluation and assessment systems now being offered.

It is during this period of time that we found our colleagues were attempting to define vocational evaluation processes and establish it as a legitimate discipline within rehabilitation. Issues of professionalism (Walker, 1970; Rosenberg, 1970; Pruitt, 1970) and of the role and competencies needed by those doing vocational assessment (Genskow, 1973; Clark, 1969; Coffey, 1978; Coffey, Hansen, Menz, Coker, 1978; Ellien, Menz and Coffey, 1978) were raised as extensions of other fundamental disciplinary concerns: the role of the evaluation specialist (Pruitt, 1970), the traditions of a profession (Neff, 1970; Lustig, 1971; Nadolsky, 1971), the applications and utilization of evaluation results (Gellman and Soloff, 1976; Hoffman, 1976) and the relationship of the evaluator to other professionals (Clark, 1976). And, several attempts were made to relate how research should be conducted in the interest of the discipline (Neff, 1960, 1969, 1970; Spergel, 1970; Overs, 1970) and how differing research needs might be systematically attacked (Dunn, Korn and Andrew, 1976).

Major symposia and conferences provided the forums at which these issues were articulated. Among the most frequently cited are the Iowa Conference on prevocational and vocational assessment (1960), the invitational conference on new directions in rehabilitation at Sinai Hospital in Baltimore (Smolkins and Cohen, 1971), the Institute on Rehabilitation Services on the role of vocational evaluation in rehabilitation (1972), the Vocational Evaluation and Work Adjustment Association project on issues underlying theory, processes, and validity of vocational evaluation (VEWAA, 1975) and the conference on critical issues in vocational evaluation held by the Research and Training Center at the University of Wisconsin-Stout (Dunn, et al., 1976). Those early debates dealt with basic issues surrounding the philosophy of vocational assessment, the very language of vocational/work evaluation/assessment, whether a theory of evaluation could be set forth, the criteria that are appropriate for judging evaluation's worth, and the contextual, program and client variables which enable or prevent vocational evaluation (vocational assessment) from being effective. Many of the issues relating to theory, practice and professionalism in vocational evaluation/assessment raised at those conferences have been responded to in other papers at the current Forum. There appears to be a rather healthy, though tentative, consensus about the major premises, terms and assumptions underlying the several theories of vocational assessment/evaluation. We note some clarity and acceptance of what it is that vocational assessment is trying to do and the variety of technology which can be brought to bear. It also appears that there are major professional skills issues yet to be resolved (e.g., who can or should do it, what skills are need for doing it in different settings, accreditation, credentialing, licensure). Collectively, these issues and the tentative resolutions we find in the literature should be kept in mind as we try to explain accomplishments of the field in response to our past research priorities. The narrowness of the issues dealt with in vocational assessment/evaluation's research and generally low level of scientific quality of research conducted during the 1960s and 1970s is partially explained by the turmoil faced by the field and, in no small way, is related to how the field, at that time, valued research.

Rosenberg (1970) characterized the direct approach generally ascribed to by the field in how practitioners adopt, install and accept a particular evaluation technique or system.

> Rehabilitation agencies have had a tendency to develop vocational evaluation programs from inadequate information obtained from staff members setting up these programs, patterning their programs around agencies running evaluation units, and duplicating programs described in the professional literature. It is a remarkable accomplishment that rehabilitation agencies have developed so many outstanding vocational evaluation programs without the benefit of scientific and tested methods. (Rosenberg, 1970, p. 30)

While Rosenberg expressed cynicism about how programs come about, in spite of themselves, without the guidance of sound research, Spergel was acerbic in his judgement of evaluation's disciples of the 1960s. He "challenged them" for their aspirations of disciplinary acceptance, while they denegated research, and for their penchant to accept or reject a technique or practice based on limited evidence. Dunn (1976) was to later refer to this as a kind of product sanctioning or product evaluation using "presumptive validity."

> While research is defined as a ... systematic, detailed, and relatively prolonged attempt to discover or confirm the facts that bear upon a certain problem or problems and the laws or principles that govern it .... (and) the essence of the concept seems to escape the field of vocational evaluation.
>
> (The) rationalizations, denials, pedantic intellectualizations, and projections of work evaluators ... must be recognized for what they are: pure (but not simple) defense mechanisms to sustain their vested interests and justify their existence. (Spergel, 1970, p. 21)

Walker (1970), in a less than well cited paper, built a meaningful case for those in the then emerging profession or discipline of vocational evaluation to develop the tradition among practitioners for conducting and incorporating the results of research in practice. Like Spergel, he saw research as an imperative tool. Unlike Spergel, though, Walker brought the challenge home to the practicing evaluator; to the level of pressing him or her with the prospect of obsolescence. Walker warned that the field of vocational evaluation could destroy its gains and value if it imitated other disciplines in the behavioral areas: developing codes and standards to perpetuate its position among other disciplines, rather than putting its energies into actions which will insure continued gains and adaptation to the needs presented to it.

> Tottering professional organizations share ... one common denominator which has created their

> current plight .... the problem of responsiveness .... (Unless) a system is constantly responsive to the needs of its clientele and the general community, it assumes a posture which could at best be described as irrelevant. Fields become irrelevant because they fail to develop a feedback system which narrows the gap between what they are and what they ought to be.
>
> In spite of some early warning signs that vocational evaluation is already suffering from early senescence, it can, by viewing other tottering systems (social work, psychology, psychiatry, speech pathology), prevent the cancerous growth of irrelevance. Rather than adopt the popular cocoon model, it can develop a system of feedback which may produce its share of discomfort but which can also insure that the field is capable of effectively responding to those it serves." (Walker, 1970, p. 39)

Consequently, the focus in debate came to whether meaningful research could actually be conducted on vocational assessment and, if so, which issues were of highest priority. Spergel (1970) believed that "... work evaluation, operationally defined, whether it be classical psychological testing, job analysis, work samples, the situational or work adjustment approach ... or job try-outs ... lends itself to reasonably well-designed experimentation." That adequate research is not being done, he might argue, relates more to the disciplines not accepting this as fact, than it does to whether it can be conducted. Overs (1970) believed that significant parts of the problem of doing useful research on evaluation were rooted in the discipline's failure to share research in the usually accepted ways (via journals or widely distributed reporting), its not building upon previous research (no one ever cited anyone else), its use of naive research methods and its tendency to either too narrowly or too expansively consider the scope of their research questions.

Neff's (1960, 1970) observations on scientific methods were reminders which placed much of what could be done in research on vocational evaluation into perspective. He provides the reminder that, regardless of the discipline, there are three underlying principles governing scientific inquiry: (1) controlled observation and reporting of the results of our inquiry, (2) underlying predictability of events and behaviors as a basis for establishing laws or principles, and (3) valid techniques for recording (measuring) the significant occurrences of non-trivial events and behaviors. Failure to incorporate these as considerations when conducting field research yields research which cannot help but be shallow and lacking in any meaningful contributions to the discipline.

Neff (1960, 1970), Spergel (1970) and Overs (1970) were not just critical of practicing evaluators, faulting them for their non-reliance on the wisdom and veracities which research produces. Each was an active, productive researcher trying to solve the very problems they were raising among their practicing and academic colleagues. Neff offered research priorities which were both pragmatic and methodological, ones which are fundamental topics of concern in evaluative research: Who do we serve, how effective are our evaluation procedures and what methodologies are most effective in researching behaviors and validity of evaluation practices.

The nature of Neff's priorities attempted to point out needs for completeness, depth, accuracy and generalizability of research on evaluation procedures to the discipline. Neff's emphasis on "targets of our programs," was a concern with more accurately defining groups on the basis of the functional limitations (broadly conceived) of persons comprising our targets, instead of relying on such a simple classification trait as "type of disability." As he viewed the need to determine program effectiveness, his point was that we should design studies which fully examine a meaningful set of contributors to program effects against viable criteria of program effects. His emphasis on need to improve evaluative research methods was a recognition that selection and measurement of success criteria are fundamental problems which must be solved. As follow-up studies are integral to conducting appropriate controlled studies of effect, improved procedures are needed for selection of representative samples, determining appropriate interval and frequency of follow-up, locating subjects for follow-up, structuring inquiry and data collection during follow-up and accounting for the influence of follow-up on observed findings.

Studies of effect and efficiency would be more valuable if they reliably related contextual (e.g., availability of community resource, familial support), process (e.g., staff cohesiveness and competence, data used in decision-making, as well as program structure) and person (e.g., functional limitations, work history, attitudes) variables both to simple criteria (e.g., time to accomplish an outcome, utility of assessment reports, successful closure) and to complex criteria (e.g., indicators of in-process immediate and long-terms effects, impact on vocational decision-making, and direct, indirect and cumulative effects on rehabilitation). From such studies, Neff suggested, we would not only gain evidence documenting the predictability and efficiency of our methods and more exacting definitions of what the technology of vocational assessment is comprised, but also a more complete knowledge of with whom and with what resources such results can be realistically assured.

The issues and priorities which Spergel (1970) identified pointed the field toward research priorities quite different from those identified by Neff. While Neff's pointed out research needs focused on the evaluation of program effects and efficiency, Spergel's seemingly specific topical priorities pointed to needs for careful inspection and testing of the foundations of the vocational assessment and evaluation processes used in the field. Spergel saw needs for research which specifically judged the soundness of the assumptions upon which evaluation systems and assessment devices were developed (e.g., the discriminant validity of the Data-People-Things classification upon which several commercial evaluation systems were based), validity of the instruments or systems among different sub-populations (e.g., responses of culturally or functionally distinct evaluees to instructional formats, effects of learning during assessment, reliability of observed performance, appropriateness of norms), and both the predictive validity (e.g., response to rehabilitation, correlation of assayed capacities with training outcomes or career achievement) and concurrent validity (e.g., physiological correlates during work sample performance, inter-system/test correlation) of specific evaluation measures.

Genskow (1973) and Brolin (1973) were among those who laid the early groundwork for the research needs identified as most critical for vocational evaluation at the University of Wisconsin-Stout Research and Training Center invitational Conference on Critical Issues in Vocational Evaluation (Dunn et al., 1976). Habilitation or rehabilitation is generally accepted as the ultimate, long-term criterion for educational, medical and vocational rehabilitation practices. However, we find little agreement in vocational assessment research as to what could be the optimal predictors of such a criteria. From a research point of view, this is known as the "predictor issue," the joint problems of identifying independent variables and of selecting appropriate measures or indexes which may predict eventual habilitation or nonhabilitation among different people in vocational assessment. For the practice of assessment, this predictor issue means that we cannot reliably estimate whether different evaluees are more or less likely of becoming habilitated or rehabilitated.

Genskow, in talking about the importance of the "evaluator as a synthesizer" of information, offered the field a unique way of viewing the evaluator as a professional, and may have fostered a trend in vocational evaluation research which is yet to be realized; consideration of assessment as a complex activity in which the use of testing/assessment technology is only one part. Strictly defined, evaluation is a process for gathering information upon which some set of recommendations can be validly based. Under Genskow's conceptualization of the evaluator as a "synthesizer," information gathering, using specific techniques (tests, work samples, systematic observation), is one of several subprocesses, among which interpretation, sharing and responding to evaluative results on the part of evaluator and evaluee may be of equal significance in terms of their contributions to the impact of an individual's evaluation. This type of reasoning opened a direction for research which conceived evaluation as a "synthesizing process," in which the specific technologies and processes combine and become part of the predictor issue, a complex predictor of an evaluee's potential for successful habilitation.

Brolin (1973) not only raised issues of when and how evaluation should be used in the rehabilitation of disabled persons, but offered the field a most pragmatic summary of the real research issue that those conducting any assessment process (psychological, personnel, physical, work, vocational) must resolve; the issue of the validity of the individually derived vocational evaluations.

> (The) ... field of vocational evaluation appears to be existing without a systematic body of knowledge .... (because) the evaluator approaches his job in an a priori way, i.e., assuming that what he is doing is reasonable and self-evident .... I take the position that a scientific approach is needed if vocational evaluation is going to have any degree of validity ... and has the characteristic which is the hallmark of the scientific method, self-correction." (Brolin, 1973)

The Conference on Critical Issues also brought together much of the thinking and research literature respective to needs in vocational evaluation. In particular, the conference focused the concerns of the field on fundamental professional and research issues: Fundamental technical issues respective to the tools and technologies used by evaluators and fundamental programmatic issues related to the quality, value, impact and ethics/professionalism of vocational evaluation. In their summary of the proceedings and outcomes of that conference Dunn and his colleagues (Dunn et al., 1976) elaborate and discuss the various sides of the two classes of issues. Of the two types of issues, clearly more serious needs for research were seen with technology of evaluation. Considerable research was found to be needed which would yield evidence as to the reliability (e.g., retest reliability of performance on work samples, inter-observer reliability for situational assessments, internal consistency in interest scales) and validity (e.g., prediction of training outcomes, concurrent validity in terms of industrial norms) of the work samples, situational assessment approaches and tests most widely used with special populations. Considerable discussion was also given to the responsibilities of developer and user in establishing reliability, validity and norms; to whether a psychometric model or some other model should be the basis for establishing evaluative reliability and validity; to the need for practitioners to accept the concepts of reliability and validity; and to which type of norm is most appropriate (client, student, industrial). Some of the programmatic research needs were to determine with whom vocational evaluation was effective, determine the role and function of evaluator and evaluee in evaluation decision-making, determine the effectiveness of different evaluation methods and determine the role and function of the vocational evaluator.

### Reviews of Research

A review of the research literature on therapeutic effects of vocational evaluation was conducted by Herbert and Menz (1981) to see whether there were generalizable themes regarding what evaluation does to people who go through it (as opposed to what information they acquire). As proponents of the hypothesis that any process in which humans are active participants will have measurable (preferred or not) effects, the reviewers sought to find out whether their shared expectations were borne out in the literature. Herbert and Menz found a generally inconclusive body of research. They found neither support for their basic hypothesis nor evidence sufficiently convincing that a null hypothesis was more tenable. As Neff and others had found, much of the research was narrow in its conceptualization, clearly flawed and naive. Their concluding reactions were ones of dismay that the approaches used so often stressed practicality to the extent that the very attempts to apply basic research results to practice quite often destroyed either the credible generalizability of the knowledge derived from the research or aborted a perfectly good piece of "new knowledge." Most of their recommendations focused on use of research methods, as suggestions to improve the likelihood that research findings could be accumulated. In particular, they noted the needs to more accurately define dependent and independent variables, to use varied kinds of research designs, to conduct replication studies, to incorporate multi-criteria and multi-measures within the research design, to be innovative in methods used to solicit information or measures of processes and results, to establish consistency in data collected inter-study, and to report research findings in professional journals and respositories.

Berven conducted a survey review of the vocational assessment literature for the National Rehabilitation Information Center (Berven, 1983) and more broadly considered the problems and accomplishments of research on assessment than did Herbert and Menz. Included in Berven's review were 281 of over 500 documents available in journals, as books, and in the various retrieval system generally accessed by practitioners and researchers in vocational assessment (e.g., ERIC, NARIC, REHABDATA, The Materials Development Center at the University of Wisconsin-Stout). The 281 documents fell into six categories: General References (7%) such as bibliographies, books, reviews; Instrumentation Reports (40%), describing, documenting the technical characteristics and applications of rating scales, tests, batteries, work evaluation systems and observation systems; Program Reports (19%), describing assessment programs, their goals, applications and occasionally outcomes; Predictive Research (9%), reporting on validity of predictions and recommendations and effects of evaluation on client and counselor behavior; Research on Competing Variables (2%), reporting on factors which influence client performance in vocational assessment, such as test-taking conditions, evaluator behaviors, and client characteristics or behaviors as influencers; and Decision-making Research (1%), reporting on decision-making behaviors of clients, evaluators and counselors.

As the largest category of documents included dealt with "instrumentation," Berven commended what research there was for its attempt to establish criterion-related validity. Still, he concluded, "In general, research on reliability and validity of instrumentation has been limited, and there is consequently little empirical basis for instruments and systems commonly used in vocational assessment." (Berven, 1983, p. 1) As is evidenced above, in terms of the extent and quality of research reported in those documents, Berven drew the following conclusion regarding the evidence in support of vocational assessment:

> Despite the vast amount of literature available on vocational assessment, empirical research in this area has been quite limited. Of the many documents which report on instrumentation and assessment programs .... the empirical basis underlying many of these instruments and programs is lacking. Consequently, in using commercial vocational assessment systems, rehabilitation professionals often have no assurance that performance in assessment has any relation whatsoever to employment potential. Similarly, in virtually every category of documents reviewed, research evidence is insufficient to draw conclusions with any great degree of confidence." (Berven, 1983, p. 4)

As a result of his review Berven identified six types of needed research. In many respects these needs are a reflected extension of that which Neff, Overs, Dunn, Brolin, Genskow, Spergel and the casts of thousands posed in the 1960s and 1970s. In some respects, too, they represent unfinished tasks of a discipline in the process of growing. Research in assessment are needed to establish competitive or industrial norms for commonly used devices; establish reliability (especially inter-rater, test-retest) and validity (long-term predictive and of professional observations) of commonly used devices; determine impact of non-standard administration of standardized instruments (e.g., adapted tests for functionally limited persons); document value of assessment against multiple criteria; determine how person, test condition and professional practices influence individual performance; and determine clinical judgement and decision-making strategies used in evaluation.

Both reviews reflect a continuing problem with vocational assessment research. While, the application of research methodology in assessment research has improved over the years, as practitioners have had better training in professional practice and research skill areas and as technical support for doing research on assessment has improved, the inconsistency with which adequate methods are followed still seriously hinders the field in its assimilation, integration and proffering of empirically determined underlying evaluation principles. Fortunately, there are beginning to be substantive exceptions to this finding. The research on the effects of assessment on vocational attitude can probably be accumulated and synthesized. The body of research on the McCarron-Dial could probably be brought together to begin to define its basic structures and construct validity.

## Contexts of Research Needs

The professional and research literature on vocational assessment processes provides one valuable source of understanding of the major issues with which the field is or needs to deal. Advancements and research in vocational assessment are most often, though, reactive products; the discipline's response to perceived political, social, technological and economic trends and pressures. New populations (e.g., learning disabled, culturally disadvantaged, close-head injured) are addressed in assessment service and studied in research as political and funding priorities redefined because of pressures applied by advocates for that population. Evaluation technology and processes are developed or reconfigured to meet the need. Research is conducted to determine whether such configurations are appropriate. A major technological development in such an area as microcomputers promotes a host of new priorities and applications based on that technology. Assessment processes are enhanced so that evaluees with a potential for this expanding employment market can be identified and properly trained. New evaluation systems are developed in a microprocessor environment and marketed. Research is conducted to determine the validity of the enhanced assessment tools or the utility and impact of the new systems on habilitation. As we go about posing directions for vocational assessment processes and, consequently, specific issues of concern for assessment research, we must remain cognizant of the fact that vocational assessment is the result of and does take place in a broadly based context. Whether we are conceiving a newer way to deliver our technology or we are conceiving the questions which drive our design of research, it is of considerable value if we have a feeling for how some of the major forces can drive or restrict the value of our efforts. Among the many possible sources which may influence our efforts, I find that refocusing of work that is occurring in the American economy, political and social changes which are beginning to reshape rehabilitation and educational processes, changes in the demography of our national population (and particularly our urban populations), and changes in the capacity of our current social service industry to meet the specialized assessment and habilitation needs of significant segments of our population are most prominent. How each of these four shape vocational assessment processes and determine timely research issues are discussed in this section. In the subsequent section of this paper, the issues raised by these influencers and issues identified in the professional literature are brought together and offered as a program of research.

## Changes in Work as Influencers

The most frequently cited influencer of what it is that will be focused upon in vocational assessment is the shift in our industrial base as a result of new technological advances and the increasing technological competence of formerly less technologically sophisticated nations. As foreign products became competitive in both quality and price, as the numbers of their producers increased, as more companies became multinational, and as trade barriers were penetrated, export and national markets for mainstay American products became progressively smaller. Significant numbers of jobs in primary industries (e.g., steel, automotive) and in secondary industries (e.g., parts supply, construction, agri-business) disappeared, thereby increasing job competition and needs for retraining for different jobs to which existing skills might be applied. And, as was the case when the integrated micro-circuit was successfully developed and incorporated into the design and production of business and military computers and, recently, microprocessors, whole new primary (e.g., computer manufacturing) and secondary industries (e.g., software developers, peripheral suppliers) have emerged. These emergent industries' expanding labor force have significant needs for workers to fill jobs requiring unique skills and aptitudes for which many displaced workers may not have the requisite aptitudes and capacities to be retrained.

The demands of jobs and the workplace will, of course, always have a considerable influence on on what it is that our vocational assessment processes concentrate. It is perhaps a particularly major influencer at this time because the shift in our economic base is occurring so rapidly that considerable trauma is being caused for not only those displaced from jobs and those trying to enter the workforce for the first time, but for those still in the workforce.

> Technological advancements have resulted in a reordering of the labor market and posed threats to traditional employment in many occupations. More recently, the scarcity of some natural resources and the limited availability of other resources have dampened the optimism with which Americans have traditionally viewed the future. (Berland and LeClair, 1981, p. 18)

The skill and aptitude requirements for jobs (whether the jobs are emerging ones or traditional jobs) must be adequately and validly measured by our evaluative devices. The continuing challenges for both practice and research is to isolate the importance of specific skills and aptitudes for jobs available in industries (locally and nationally) and to maintain an assessment technology which yields realistic retraining/job options for the displaced or disabled worker and realistic career/training options for the person beginning or returning to work. The new challenge will come as we attempt to identify and measure needs and social reinforcers which those jobs and occupations meet. Programming to accomplish adaptation to new work, particularly among displaced workers moving into alternative occupations during their mid-40s and 50s or among growing minority populations, may become an especially important goal for rehabilitation and education in the next decades. Evaluation of potential for adaptation may, then, become a critical new role for vocational assessment and a topic in of itself for assessment research.

## Political and Social Change as Influencers

Political decisions and the social changes which come about as a result of those decisions will markedly influence the structure of vocational assessment and what research is needed. The potency of this influence derives from the justification for vocational assessment with disabled and special needs populations: Most vocational assessments are authorized or required by federal and state laws as part of a training, educational or rehabilitation process and most vocational assessments are paid for with public funds (Berland & LeClair, 1981; Menz, 1981, 1983a). When pressures created because of diminished and inconsistent public funding (of rehabilitation services) are examined, a cascading set of influences can be traced to how a service becomes restructured (Menz, 1983a). Diminished or inconsistent funding gives way to external forces determining how and what is provided under the rubric of a given type of process. For instance, the need to compete for limited public funds and, subsequently, to survive in the for-profit market, coupled with increased buyer expectations and demands for documentable results, may lead to configuring evaluations processes which are narrowly goal-based and prescriptively focused around determining retraining potential among a very specific set of jobs. Increased innovation in evaluation (use of novel approaches to assessment and an infusion of technology) may be the positive gain for the discipline. The negative side, though, is that there will little evidence to support the validity and impact of these innovations on educational or rehabilitation outcomes and diminished interest or resources to gather the needed evidence.

Social changes will play a significant part by shaping who it is that is given priority and to what dimensions of the evaluee and the labor market attention is focused upon in vocational assessment. Four particular social changes that have have resulted from public policy decisions are identified by Berland and LeClaire (1981), for which how such social changes can influence the utility and effectiveness of vocational assessment. First, the lowering of the rate of economic growth is expected to continue to cause employment to lag farther behind population growth, a lower overall productivity in the labor force and decreased public resources to provide for assessment and training of those displaced or disabled during employment. Second, significant health care advances are expected to reduce the incidence of some disabilities, lessen the consequences of disability for others and restore the functional capabilities of many others, resulting in an increase in the numbers of persons needing specialized evaluation for return and readaption to work and especially of those who previously would have been considered too severely disabled. Third, deinstitutionalization, in conjunction with improved health care, is also expected to increase the absolute numbers of disabled persons in the general population, increase the numbers of those seeking some form of employment (in protected, supported, community-based or competitive setting) and create additional demands on diminishing public resources, resources which they, like other disabled persons, will need for skills acquisition and adaption as they attempt to achieve vocational and social integration. Fourth, advocacy and self determination of disabled persons are expected to become increasingly evident (as encouraged through various commissions, regulations on client and student rights and accessibility, lobbying accomplishments, disability specific support groups, social and industrial action groups, and the host of special programming in athletics and recreation, special olympics, independent living, and assertiveness training now provided to disabled youth and adults), not only evidenced by their increased visability in many vocational and social contexts, but as evidenced as well in their increased demands for equal participation in social and political activities and a more prominent voice in planning and monitoring their rehabilitation and education.

Because of such continuing influences, authors like these, expect that research on many social programs (of which vocational assessment is often an integral process) will become increasingly focused. Research will be needed to monitor changes in the effectiveness of processes as increased numbers and more diverse groups seek the programs and reduced resources are available for supporting them. Research is likely to be needed which helps justify the utility of programs, not only in terms of their cost-effectiveness (e.g., wages earned relative to the poverty level, wage gains subsequent to rehabilitation, rates of return on investments of public and private funds in rehabilitation), but in terms of its societal impacts (e.g., incidence of disabled persons in growth careers, participation of disabled persons in vocational, social and political roles). Further, research and development are likely to become more closely related. There will be need for research which aids in design, development and demonstration of rehabilitation-habilitation-education systems which are likely to be more complexly integrated, which attempt to achieve related vocational and avocational goals, and which may employ state-of-the-art technological processes and devices, unique staffing and resource controls in an effort to assure specified levels of effect and quality.

## Population Changes as Influencers

The demographic composition of the American population, the incidence of disabled persons in it and the likelihood that its composition and needs will change dramatically during the next decades will be, perhaps, the most significant factor influencing the form and substance of vocational assessment. The challenges such population changes produce for assessment will have their parallels as they produce considerable new needs for research on both the validity of the assessment technologies and the effectiveness of the processes with different groups of persons.

According to census data (U.S. Department of Commerce, Bureau of the Census, 1983), 8.9% of the American population between the ages of 16 and 64 years report a work related disability. Several dominant patterns are revealed among these 13,000,000 persons: First, with 61% between the ages of 45 and 65, the current disabled population appears to be considerably older than the national average. Second, while 17% of the national population are Black or of Spanish origin, they are over-represented in the disabled populations at 22%. Third, disabled minority group members are less educated, are ethnically distributed (there are higher incidences of disabled Blacks in the south and of disabled Hispanics in the west), are more likely than their white counterparts to live in our inner-cities, and are more likely to be out of the labor force. Fourth, while disabled males earn 79% as much as a non-disabled male, disabled minority group males earn only 62% of that and disabled women earn only 48% as much as non-disabled males.

As the current disabled population is considerably older than the national average, for the majority of disabled persons, their needs are for retraining to reenter the labor force in modified or related occupations, not for developing original skills. For them, assessment systems are needed which identify transferable skills and aptitudes, retraining potential and supportive resources that may be needed due to ageing and disability (e.g., independent living) (Bowe, 1982). On the other hand, there is a significant culturally distinct portion of the disabled population who are considerably under-employed and vocationally isolated. The challenges to the discipline to meet the needs among this sub-population are considerable, the least of which is finding and making vocational assessment available. For this minority, evaluation systems are needed which identify skills and aptitudes for jobs and careers that are likely to yield higher earnings, which evaluate potential both for initial entry and re-entry and for advancement in the labor force. Such evaluation devices must be demonstrably unbiased among culturally unique populations and, quite likely, validated within a particular geographic region (e.g., a specific urban or employment market).

U.S. census data provide an indicator of the prevalence of disability within the current national population. From these indicators we can derive a feeling for the types of services that are presently needed. Data on replacement rates (birthrates versus deathrates), legal and illegal immigration, population mobility, shifts in the industrial base and concentration of industry used by demographers and futurists to estimate how the national population may change will provide indicators of how the disabled population is likely to also change. Based on these indicators, we can garner ideas on how services may need to change in the coming decades. If the projections of demographers are anywhere near accurate, immigration will be the major influencer for our vocational assessement discipline and assessment research.

Bouvier (1983) and his colleagues at the Institute for Demographic Studies, in Washington, attempt to trace how the nations population will change over the next decades in relation to population growth among developed and undeveloped nations. They project (Bouvier, 1983) that population growth in most developed nations (e.g., Western Europe) will continue to decline over the next 40 years, while population growth in less developed nations (e.g., Africa, South America) will continue to increase during the same period. Unlike most other developed nations, and despite the birthrate among native Americans (second and third generation citizens) dropping to slightly less than its replacement rate, Bouvier (1983) estimates that U. S. population will actually grow significantly during this period, due almost exclusively to legal and illegal immigration. By 2020, Bouvier projects that all population growth will be a result of immigration.

While immigration has historically been from northwest and southeast European countries, only 6% of the new immigrants are expected to come from these national groups. Immigrations from less developed Asian, South American, Latin American and underdeveloped African nations are expected to account for 80% of all new entrants to the American population. These immigrants are likely to be in their child bearing years, have higher birthrates than the native Americans, have fewer transferable skills and bring distinctive languages, values and cultural identity. With immigration taking place at a rate of 600,000 per year (legal entrants only), Bouvier projects that by 2030 20% of our population may be composed of minority or first generation immigrants and 40% by 2084.

Anneson (1984) describes an increasing role for minorities, and particularly minorities resulting from such immigration, in shaping the labor market as our economic base shifts from heavy manufacturing (steel, automotive, agricultural and industrial machinery) to an information and service industry (e.g., computers, bio-engineering, industrial processes, consumer products, recreation). He notes that immigration is not evenly geographically dispersed, but instead is regionalized, based around particular countries of origin. As immigration to these regions continues, Anneson projects that not only does the language, values and culture within that sector become increasingly similar to that of the countries of origin, but that the market focus of the industry in such regions also becomes focused. Anneson sees this as particularly possible in an economy moving from heavy manufacturing and marketing toward an economy based on information and services, for which capital outlay to develop and market products is considerably lower.

Anneson's estimates are that 70% of jobs will be in this information and service industry, 80% will be with companies not yet founded, 66% will be in companies employing less than 20 people and 33% of those new companies will be owned and operated by minority group members by the end of the 1980s. Marketing by these emerging industries in specific regions of the country, Anneson notes, becomes increasingly directed toward the countries of origin from which there has been the greatest influx of immigrants, rather than toward markets within the United States. For example, Florida is becoming increasingly focused on the culture and product needs of the Carribean basin countries, industries in the south central and southwestern states are focusing on the markets and becoming increasingly dependent on the economies of Mexico and other Latin American nations, and industries in California are increasingly marketing their products to Asiatic countries. The new minorities are expected to represent a dominant force in the labor market and assume not only a considerable voice in labor, but in determining management and personnel requirements as well.

What these data suggest is that we will become a nation of 300 million which is multi-lingual, multi-cultural and multi-valued. Population centers are expected to increasingly reflect the languages, values and cultures of the new immigrants' nations of origin. Too, a shift in power and influence on how the labor market is shaped is expected, in which the influence of languages and different cultural values and ethics are reflected in the work environment and in the priorities which emerging industries select for their products, services and markets; a shift not terribly unlike that which occurred as a result of the large scale immigration during the late 19th century.

While advances in medical science and rehabilitation will likely prevent many functional disabilities which originate during pregnancy and childhood, it is questionable whether these advances will be readily available to significant portions of the immigrant population. Because immigrants, as a group, are more apt to enter high risk occupations and are less likely to enter well paying occupations which also make provision for expensive, preventive medical care, it is quite likely that we will see higher incidences of work related and organically based disabilities among these groups. Many of these disabled persons are likely to require vocational assessment services that both identifies their potential for original occupational and career options and produces a rehabilitation and educational plan which not only considers vocational skills acquisition, but their needs for language and social development as well. Significant differences between their language, values, experiences and work ethics and those assumed under our habilitation/-rehabilitation and educational models will require us to reevaluate the validity of our assessment processes and, quite likely, devise assessment processes which are equally effective with these groups.

Research will be needed which promotes the provision of vocational assessment consistent with the needs of all major segments of our population. First, research will be needed which provides norms and standards for popular evaluation instruments for both the dominant labor populations and for local culturally distinct populations. Second, research will be needed to determine and help eliminate instructional and contextual bias in evaluation procedures which are unfairly discriminate among minority groups. Third, research will be needed which will establish the validity of evaluation instruments for identifying aptitudes and skills of culturally distinct groups which are developable or transferable between jobs. Research will be needed which will determine the effectiveness of vocational assessment instruments and systems among such regionally specific populations as aging workers, disabled women, specific current minority groups and new minorities coming about due to increased immigration. Research will be needed which will insure that affordable vocational assessment is available where those in need are located and which assesses not only dimensions of the person which are directly related to accessing employment (e.g., aptitudes, vocational and job skills), but dimensions which are instrumental in continuance in employment, career advancement and integration into the larger vocational and social contexts of society (e.g., cultural and adaptive needs, needs related to aging).

## Capacity of Services Providers as Influencers

Currently, the greatest numbers of vocational evaluations are provided to persons with disabilities or special needs under the auspices of state health, education, labor and welfare agencies (notably through state vocational rehabilitation divisions of social service programs) or through adjunct services of educational institutions. Vocationally oriented assessments provided for special needs students by secondary and post secondary schools, institutes and training centers principally reach a pre- and initial career entry age populations. As adjunct services, though, they are not consistently available in urban settings (where the largest numbers of disabled, underemployed persons and immigrants live) and are rarely available in rural settings (where geography severely restricts access to comprehensive services for the rural disabled and underemployed). As the utility and importance of vocationally oriented assessment services become better understood and part of the diagnostics and planning of student education and training, we can expect that these services will become more consistently available to adults, as well as school age students, through secondary and post secondary institutions, especially in urban settings. Increasingly, forms of vocational assessment are being introduced in settings such as public and private employment agencies, as part of disability adjudication by private insurance rehabilitation practitioners, and by some corporations in an effort to retrain or outplace their displaced employees. At present, though, the major providers of vocational assessment services are vocational rehabilitation facilities. Knowledge of the clientele to whom they are presently providing services tells us something about their capacity to serve diverse populations. Knowledge of how they are expected to be staffed in the next decade may also tell us something about how they might be able to respond to the challenges introduced by social and economic changes that are expected to take place during that same decade.

Czerlinsky and Gilbertson (1985) surveyed facilities, accredited by the Commission on Accreditation of Rehabilitation Facilities to provide vocational services, to determine characteristics of vocational facilities and their clientele. First, they found that 83% of the facilities provide vocational assessment services. Second, 86% of their clients lack formally developed vocational skills upon entry and 58% do not hold a high school diploma or a certificate of general educational development. Third, 35% are under 25 (in a stage of initial career entry), 44% are between 25 and 40 (in a career stabilization stage), while only 18% are above 40 years of age. Fourth, only 16% are physically disabled, while most have a cognitive (55%) (e.g., mental retardation) or psychologically based disability (21%). Finally, 77% are caucasian, 23% are members of a definable minority group and the majority (55%) are male.

Data on the manpower needs of vocational facilities provide some indication of how facility programs are expected to grow and how they anticipate meeting the needs of their clientele. A survey conducted in 1979 sought data on present and projected employment for the decade 1980-1990 among the 10 principal types of rehabilitation professionals working in facilities (Menz, 1983b). First, among the five fastest growing roles (rehabilitation counseling, vocational adjustment, placement, vocational skills development, vocational evaluation) administrators expect that there will be a more than two-fold increase in the numbers of each type of professional, a rate of increase rather consistent with expected growth in the national population. Second, an increase in the size of facilities (based upon average daily attendance and number of staff) is expected, with the concomitant results that a more comprehensive collection of services which focus on most aspects of vocational development and adaptation will be available in the typical facility. Third, the core of the facility program is expected to include vocational assessment and planning, skills training and adaptation to work, and placement.

While the Czerlinsky and Gilbertson and Menz data do not directly identify the emphases given in vocational assessment programs, by extrapolation of these data, it would appear that the vocational assessment programs available in vocational facilities are particularly equipped to work with a younger, white, poorly educated population whose disability restrict the range of vocational and social goals they can expect to pursue. The focus in evaluation (based upon the predominant ages and lack of skills represented) appears to be on determining how aptitudes, interests, and primary skills might combine to identify a training and rehabilitation plan to achieve original occupational goals among a population in its prime years of employment. As a composite resource, while it appears that it is best equipped to deal with a younger, underemployed population, it appears that it may be least equipped to provide assessments to either culturally distinct populations (for whom the obtaining of unbiased estimates of vocational aptitudes and needs for cross-cultural adaptation are the issues) or older populations (for whom transfer of skills and retraining is more the issue than identification of original aptitudes and careers). Growth in these programs in the coming decade is expected to be consistent with the increased number of disabled persons and become increasingly comprehensiveness such that assessment and training will be more closely aligned and related to planned for competitive employment. As a primary resource, how this resource evolves and adapts as well to changes in population and responds to technologically determined needs might result in priorities for research focused on the comparative validity, utility and impact of assessment programs sponsored by such non-traditional groups as the military, private industry, insurance companies, job-corp-type program and community action groups, as well as traditional school-based, facility-based and health care-based setting in the coming decades.

## Needs for Research in Vocational Assessment: A Program

As the professional and research literature were reviewed and the relationships of social, economic and political trends examined for their potential impact on the discipline of vocational assessment, one should be reminded that the maturity of the discipline can be measured by its ability to be self-correcting (Brolin, 1973) and that utilization of sound research on practice is our best resource for keeping the discipline credible: Research should provide us with knowledge about what it is we try to do, provide us with knowledge about how well we do it, provide us with the bases for development of new, better devices, technologies and processes, guide us as we develop relevant, dynamic empirical models and provide the foundations for developing a functional theory of vocational assessment. The general needs for research will always remain. It is only the specific topics which change as the sophistication of the discipline evolves in relation to its broader societal context. I find that we must encourage a broad range of research through organizational standards, collegial support, funding, professional activities and dissemination practices. A classification of seven types of research is suggested: Descriptive research, research synthesis, operations research, foundations research, inferential research, research on professional issues, and topical research. Specific examples of issues or research needs are also provided for each classification of research.

### Descriptive Research

The goal of descriptive research is to provide accurate documentation for prominent examples of what it is that we consider vocational assessment/-evaluation. Descriptive research can take on many forms, but in each case, its intent is to document. Greatest value is accrued, of course, when there is a clear link between the part or process described and a particular model or theory, but as often as not, such descriptive efforts provide the substance upon which models and theories are posed.

1. Program descriptions. A particularly useful form of descriptive research is a study which yields a formal program specific description. These researches are useful at a the program level as they provide on-going information about what precisely takes place in assessment, the changing characteristics of persons "treated," the conditions under which the assessment takes place, staffing characteristics, typical and a typical flow and sequence of experiences, resources

needed or consumed, technology used and changes in outcomes achieved under the program.

2. Case studies. In a case study, significant features of a process are related to differential outcomes among a specific group of persons or set of events. For instance, a case study might be a documented analysis of needs, problems and adaptations an evaluation center made to a set of evaluation devices in order to evaluate four brain-injured persons. Another case study might analyze how mandates and intents of federal legislation and guidelines for serving cognitively impaired children are responded to in state vocational and education policy and resource allocation and the extent to which those intents are realized in the programming of selected school districts. Such case studies are particularly useful for developing the content portions for model practices or to arrive at better definitions (conditional though they may be) of our assessment processes. From this research, probable independent or competing variables might be isolated and possibly confirm descriptions of models which may be suggested in theory.
3. Historical analyses. A common taunt in education and rehabilitation is "We already tried that 20 years ago, so why re-invent it now?" In historical analyses, survey, census and anecdotical data are used to trace what has and is being done under the guise of assessment (our instruments, goals), where it is being done (prevalence in educational, commercial, rehabilitation settings), who is doing it (professional skills, training), the characteristics of the populations to whom it is being applied and whether these variables are changing in any notable way. The objective in this type of descriptive research is to maintain currency in our knowledge of practice, coupled with an informed perspective of why and of what it is that we are up to in practice.

## Research Synthesis

Synthesis relates research findings to practical and theoretical models, helping the discipline advance its knowledge base. While research synthesis relies principally on the research literature, it can draw upon a broad range of data sources. It both forces an integration of research results with practice and theory and a cognitive review of ones own knowledges and experiences. The best syntheses are topic driven, that is, focused around one or two significant issues. Quite often this task is viewed as ideal for the "graduate student;" a method useful in helping them learn about the discipline. If our objective is to build a formal base of knowledge in the discipline, though, effective synthesis requires practical and research experience to judge and relate the findings to the multiple aspects of an issue and discern the validity of methods, analyses and conclusions derived under a study. Some examples of useful research synthesis are those reviews presented in the Review of Education (sponsored by the American Educational Research Journal), the Journal of Rehabilitation October-December 1981 special issue on rehabilitation of older persons, the Brown, Gordon and Diller (1982) review of approaches to functional assessment and the Herbert and Menz (1982) review of attitudinal effects of evaluation. Syntheses which could be useful for practice might separately focus on topics such as the following:

1. Synthesis of methods and models used to validate and norm devices and technology (tests, observational systems, performance systems, computerized assessment and exploration systems) used in vocational assessment. What are the primary methods, which methods are most appropriate to which technology, to what broader psychometric or assessment models do they relate, how can they be used in field and commercial settings, and what standards are currently applied in validation and norming?
2. Synthesis of education and rehabilitation research literature on the effects of administrative conditions and learning on evaluative performance on aptitude and achievement tests, interest inventories and work samples.
3. Synthesis of research literature on cultural, language and functional bias in instructions, format and contents of primary psychometrics and work samples used in evaluation in both educational and rehabilitation settings.
4. Synthesis of the utility of primary psychometric, work sample and situational observation systems with specified disability and ethnic groups. What evidence supports their use in vocational exploration, planning and decision-making and how valid is it to apply these devices with culturally distinct groups?
5. Synthesis of the types and validity of outcome indices and measures used to estimate the effects and efficiency of vocational assessment. What are they, what evidence supports their use and how can they be obtained and used in evaluation of assessments provided with different populations in different settings?

## Operations Research

Operations research is a must for the individual assessment program and for the developers of evaluation technology. For the discipline, operations research is perhaps the form of research practice most likely to insure the kind of feedback which Walker (1973) believed a dynamic discipline must have to keep itself relevant. In deference to descriptive research, with its particular role of documentation, under operations research ongoing data are collected and maintained in order to determine when and to what degree the program or devices on the market begin to yield differential effects. Analyses of these research data are conducted on a regular, cyclic basis (by program personnel or by commercial personnel) for monitoring and evaluation of impact, for monitoring changes taking place in a process or system, and to maintain control and planfulness in keeping with dynamics of a program or need for a product. For a program, data are regularly queried to determine change in immediate and long-term effects, in efficiency, resource utilization, equity, consistency, replicability, and in populations, needs and priorities. For the commercial developer, operations research focuses on changes in validity, appropriateness with new populations, currency and norms of for devices and changes in product marketability and consumer needs. Many of the publications on program evaluation for defined systems provide guidance on how this kind of research might be conducted in a vocational assessment program. Changes in the following are typical issues which should be regularly determined through ongoing operations research:

1. Resource needs, availability, utilization and costs.
2. Stability of outcomes, utility of evaluation results, and predictive validity of training and employment recommendations.

3. Currency and validity of norms and norming populations for principal evaluation devices in use or being distributed.
4. Reliability (stability) and validity (accuracy) of evaluation and assessment data achieved under or observation and testing devices.
5. Impact, needs and involvement of consumers in evaluation processes.
6. Goals, technology and role of staff, evaluee and significant others in planning and delivery of assessment.
7. Community, referral, funding and political support for program.

## Foundations Research

Foundations research focuses most peculiarly on the validity of our endeavors, going into greater depth and generalizability of the specific applied contexts of issues under operations research. Again, the issues related to are those of norming, of validity and consistency of the technology we use (tests, work samples, observation systems, batteries, commercial evaluation devices we buy, adapt and use) and of the composite effectiveness of the processes, practices and technologies we bring together in evaluation. These are planfully devised research, research upon which generalization can be accomplished and research which challenges and raises issue with the precepts, theories and fundamental assumptions upon which the discipline is currently based. The null hypothesis that "the Emperor is naked" is repeatedly tested. The results of these many-folded research efforts, for instance, are intended to dispel false assumptions about what it is that evaluation can do, eliminate false expectations for evaluation technology and discourage use of invalid devices and observational techniques.

There are of course many issues surrounding how one goes about doing this kind of research, but there is also a substantial body of literature to provide guidance for developing evaluation programs and evaluation devices (whether practitioner, research or system/test developer). McCray (1982) describes what is needed and how one goes about setting up a vocational assessment program that can help to identify both the vocational and educational needs of students. Esser (1980) provides suggestions on how to construct useful, non-standard instruments that can be used to gather evaluation data. Dunn (1973) and Dunn, Korn and Andrew (1976) explore in detail many of the issues and provide direct suggestions about how to get on with this kind of task. Botterbusch (1981, 1982, 1984) provides not only guidance on what constitutes a good work sample, but ready reference to how many have currently failed to demonstrate their worth and provides some very fundamental methods for estimating validity, reliability and norms. Berven and Maki (1982) offers a contrasting method for establishing norms among employed clients. Fiske (1960) provides convincing discussion of the basic problems in measuring capacity and performance and Finch and Impellitteri (1971) provide a valuable discussion paper on how valid work performance measures are developed. Guion (1979) provides a series of discussions and method papers on alternative methods for validation of performance and work sample assessment devices.

Perhaps, more so than any other aspect of research on assessment, the issues of concern here are perennial ones; ones which our research must address over and over again. Some of the more representative of these research issues are the following:

1. Effectiveness assessment against multiple outcomes, including utility of recommendations, predictability of training achievements, impact on rehabilitation/habilitation

and vocational and economic success.
2. Differential effectiveness with specific disability, ethnic and cultural populations.
3. Utility and validity of evaluation in educational and vocational planning.
4. Therapeutic or incremental contributions of evaluation and assessment to educational and vocational rehabilitation and habilitation.
5. Reliability (inter-rater) and validity of behavior observations in situational assessment, simulated work and competitive work settings.
6. Direct effects of evaluation and assessment on evaluee self knowledge, ability to plan and achievement of vocational or educational goals.
7. Impact of standard and non-standard administration to special populations.
8. Reliability, validity and utility of commercial work samples, psychometric instruments, computerized evaluation and exploration systems, and observation systems with discrete populations.
9. Job analysis, norming and assessment of performance skills and aptitudes for emerging occupations and industries.
10. Validity of follow-up methodologies in obtaining quality data.
11. Cost-effectiveness and social--effectiveness of vocational assessment. Including such concepts as return on investments of public and private funds, wage earnings, quality of life.

**Inferential Research**

Inferential research differs from foundations research in one significant way: It is not necessarily geared to resolving a problem related to validity. Here, we are concerned with hypothesis testing research as most of us trained researchers were led to believe in. This research deals with questions like "what if ..." Issues like, "If we identify assessment combinations congruent with the cognitive, information processing characteristics of clients, do such combinations yield a greater range of vocational objectives for clients?" or "Are there learning curves for work samples and to what extent do differing numbers of trials produce better or poorer prediction of capacity to do the task?" (Coker and Blakemore, 1984) or "Are there differential decision-making patterns for disabled high school students and disabled adults?" (Czerlinsky, 1984). The objective of this research is to discover new relationships and extend knowledge about the meaning of prior theory and research. Typical research questions that need to be answered under carefully designed research are among the following:

1. To what extent are the utility and impact of evaluation controlled by evaluator variables? In particular, evaluator theoretical orientation, competence, training, role expectations and expectations of the evaluee and evaluation.
2. How are results on measures of aptitude, skill, achievement and interests affected by evaluee responses to evaluation conditions? Specifically, how do evaluee sex, age, disability, test-taking anxiety, learning style (cognitive responses to instructional format), changes in learning under repeated trial, and vocational maturity differentially affect level and quality of scores on performance based (e.g., gross motor, fine dexterity, production rates) and psychometric instruments?
3. What decision-making approaches

are used by evaluees and evaluators in planning and synthesis of evaluation? How do such approaches interact and are there optimal combinations of evaluator-evaluee decision--making?

4. To what extent do evaluees assimilate and synthesize evaluation information and how might these capacities influence the degree to which evaluees participate in or direct their own evaluation and planning?
5. To what degree are the utility and impact of evaluation differentially affected by length of evaluations, specificity of presenting questions, emphasis given to various types of evaluation devices (e.g., psychometrics, work samples, situational assessment, computer syntheses) and such other manipulable evaluation situation variables (e.g., setting in school, consistency in funding, staffing, fee level).
6. Through what developmental stages (e.g., phases, steps) do evaluees proceed, during and following evaluation, which provide the greatest assurance that their capacity to independently utilize information about their skills, aptitudes, interest and needs will achieve a usable level?
7. What incremental values are there for psychometrics, work samples, situational assessments, counseling, evaluee participation and involvement of significant others on selection of a satisfactory vocational goal.

## Research on Professional Issues

Research on professional issues spans a wide range of potential problems which may need to be solved and issues which need to be periodically reexamined by a discipline. In a most general fashion, these issues relate to assuring continuing relevance and quality among personnel and systems (organization and political) under which vocational assessments are provided. Studies conducted by Coffey (1978), Coffey, Hansen, Menz and Coker (1977), Ellien, Menz and Coffey (1979), Sink and McCrosky (1979), and Menz (1983b) provide examples of how surveys can be used to address issues of professional competence and manpower needs. These researches should be regularly conducted to establish both baseline levels and changes that are or need to occur in definite areas:

1. Determine characteristics of and changes in need for assessment personnel. In particular, numbers of personnel in various settings and roles, salaries and fringe benefits, stability and attrition, rates of career advancement, professional affiliations, qualifications and training, perceived skill deficits and expectations for changes in numbers and roles demands.
2. Identify competencies needed by professionals to conduct evaluations in representative settings (e.g., facilities, hospitals, schools, commercial settings), under different evaluation models (e.g., adjudication of disability claims, vocational explorations, planning for training) and with different populations (e.g., cognitively limited, cultural different groups, non-English speaking persons). For instance, increased immigration of Spanish speaking clientele in urban areas could lead to needs for students in vocational evaluation programs to become fluent in a second language (Spanish) and develop a working knowledge of certain distinct culture, in order to do meaningful

vocational planning with this population.

3. Validate and norm certification and licensure instruments. As populations, technology and utilization of vocational assessment changes are reflected in needed competencies, devices used to assess such competence need to be adapted and renormed to effectively exclude unacceptably skilled personnel from the discipline.
4. Evaluate how current public policy impacts upon and restricts access to vocational assessment.
5. Identify changes in needs and priorities for evaluation clientele.
6. Identify and prioritize needs and issues for the profession.
7. Establish standards for ethical practice, minimum standards for evaluation programs and standards for validation and utilization of evaluation devices.
8. Identify alternative research methodologies for judging the utility and impact of assessment and for validation of emergent vocational evaluation technology.

**Topical Research**

The last classification of needed research is topical research. Topical research is research driven more by curiosity about unknown relationships of events to causes, events to events and causes to causes than by formally stated theory. I like the idea that "... seeking main effects in social research is a 'fool's errand' ... in that laws governing the behavior of people are much too complex to be delved into with simplistic (single) cause and (single) effect models ...." (Cook et al. in Brown et al., 1982, p.6) This kind of research is needed to help us sort out some of the complex interrelationships that not only exist between the assessment and utility in education and rehabilitation, but also to sort out some of the complex interrelationships that exist within the processes and devices themselves.

Rather than asking the questions "What is the validity ...." or "What if ...," which characterizes inferential research and operations research, this research is as much a search for the research question as it is some test of a hypothesis. It is the kind of research which has its origins in ideas other than those which may appear in the title of a proposal or report on a piece of research. Quite often, this type of research begins when one seeks greater meaning from a given piece of research; perhaps as one conducts a secondary analysis of the research data under a different analytic model or from a different philosophical perspective (e.g., a sociological perspective instead of a psychometric perspective). The issues concentrated upon may be narrowly conceived or complexly interrelated, may be derived from careful analysis of existing research or the literature and may be approached under as carefully controlled designs as with a more cogently useful bit of inferential research. Some examples of ones which might have exciting results are the following:

1. With what reliability can data from one assessment device (e.g., an aptitude test) be used to estimate performance on a construct similar instrument (e.g., another aptitude test) among specific groups and for individuals?
2. If one were to consider the "evaluation process" as analogous to a test and that reliability of the process is of paramount first importance, can a methodology be devised and tested which would provide a meaningful estimate of the internal

consistency of the evaluation process?

3. If systematic bias (discrimination on the basis of non-construct related variables) is found with a particular evaluation device, among a particular population (i.e., invalidity), under what conditions can the effects of such bias be sufficiently estimated to allow adjustment in scores and warrant its use with those discriminated groups or individuals?
4. Is disability (or need) distributed in a geographically equitable fashion? If "disability" is found to be clustered in certain population settings, how might such densities affect public policy on provision of assessment and other habilitation services?

## Conclusions

At this point in the development of the discipline, is it time to consider vocational assessment as a science? As Neff put it "... the essence of the technique of science ... boils down to ... controlled observation .... The fundamental issues ... which faces us in this field is: Can we control our observations of behavior ... so that the statements we will make have a determinant degree of dependability and reliability?" (Neff, 1969, p. 29-30)

Are observations and syntheses of assessment data dependable and reliable? What is the degree of error we make in our predictions for training and employment? Have the devices we use been calibrated to the groups, tasks and conditions under which we employ them? Are the assumptions, operational definitions and basic theorem of our practice documented and periodically subjected to empirical evaluation? Do we have tradition and a body of research which empirically bears out our practices, processes and technologies of assessment? Have our fundamental hypotheses been subjected to the scrutiny of replication and time?

These questions are some to which "yes" answers would be expected for a discipline wishing to acquire the dubious distinction of being a science. And dubious it is. From where I sit as a researcher, this discipline is an applied one, working with, assessing and aiding people with varying degrees of disability (or vocational confusion) to choose goals, training and employment which will best meet their economic and social needs. Whether or not vocational assessment is a science is a non-issue. Whether those of us in or around vocational assessment are willing to make the personal and professional investments to make sure that there remains validity and relevance in what we are doing is the real issue. Conducting meaningful research and building a body of knowledge which is subject to a minimum amount of bias and error is what we should be pursuing. When that has been done, move on to coming up with answers to the questions asked in the paragraph above. Not until our responses to those are "yes" is it the time to begin a dialogue on whether vocational assessment is a science.

> "In this period ... tremendous strides have been made in the development of knowledge and technology in vocational assessment. However, there is much work yet to be done in developing a sound empirical base for vocational assessment procedures and programs. Vocational assessment has a great impact on the lives of individuals with handicapping conditions, as it plays a major role in determining whether particular employment and training opportunities will be provided or denied. Consequently, research in this area would seem deserving of a high priority." (Berven, 1983, p. 7-8)

Should we look at the results of our research and development efforts over the past two decades with dismay? Should we feel inadequate because we have not established principles? Should we view this discipline in a cynical light and conclude that its basis is unsound? I think not. Two fundamental lessons can be derived from the above review of our progress in research. First, it should remind us that if research is to play a part in establishing the validity of a discipline, it is not a one-shot activity. Rather, it builds by reducing and isolating basic relationships. One study builds upon another, replications eliminate chance, complex designs elicit the tangled interrelationships between practices, technologies, clientele and multiple criteria and practiced syntheses provide critique of our assumptions and tentative conclusions leads to fact. Second, knowledge is not a constant, once obtained, tested and replicated, always to remain the same. A discipline evolves. Events surrounding our practices forge new directions and shape our thinking and technology. The intelligence of practitioners, clients and advocates will always allow them to reconstrue what they do as they become involved in different settings with different problems and different people. The validity of our "knowledge," "processes" and "technologies" will have to be reestablished.

Many of the issues which were raised in the 1960s and 1970s will continue to be ones we must face in research, not because of a failure of the discipline, but because they are, quite simply, the questions we must repeatedly ask if vocational assessment is to remain real: Is what we are doing consistent in terms of the people we serve? Is it valid for the purposes and persons we use it with? Does it produce the desired effects efficiently? Does it do so without prejudice? Is it needed? What is wrong with it and how can we improve it? Are we competent to do it? Is it meeting the needs of our target population? This paper has attempted to remind the discipline of the role which research does play, to restate the perennial issues and needs for research in contextually meaningful terms and to provide a classification of research that will help us to continue with the most important task of providing valid, impactful and relevant vocational assessment.

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# THE VOCATIONAL EVALUATOR AS EXPERT WITNESS

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**ABSTRACT:** Much attention has been focused on the emergence of the private practice of rehabilitation. "Private rehabilitation" as it is commonly called is considered by some to be an impressive growth industry (Lauterbach, 1982). Recent rehabilitation graduates are flocking to private rehabilitation companies for employment in record numbers. Third party payers such as insurance companies, employers and attorneys have recognized the value of rehabilitation and are hiring their own in-house rehabilitation staff. The courts, at long last, seem to be recognizing the value of rehabilitation information in determining employability issues.

Finally, the Bureau of Counselor Certification (previously CRCC) has developed a special certification (CIRS) essentially targeted for private practitioners.

At face value, it would seem that private rehabilitation is well on its way from 10 years of relative obscurity to recognition and acceptance today. Inherent in the above scenario is the fact that a variety of rehabilitation professionals (counselors, job developers, nurses, vocational evaluators, psychologists, etc.) are providing a variety of services in relatively new and diverse settings. Where, in the scheme of private rehabilitation does the vocational evaluator fit? Are the evaluator's distinct skills recognized in the rehabilitation process or litigation? And last, how is the vocational evaluator used as an expert witness? This paper addresses the major issues of the vocational evaluator in private practice and as an expert witness.

## The Evaluator's Role

The vocational evaluator has played a relatively minor role in private rehabilitation, unfortunately, at least as compared to his/her potential contribution. The majority of employees in private rehabilitation are rehabilitation counselors and rehabilitation nurses. The most frequently offered services in private vocational rehabilitation are rehabilitation counseling and job development (Matkin, 1982, p. 32). There seems to be confusion in the legal community about the distinction between vocational evaluation, rehabilitation counselors and job developers, as suggested in a recent survey of attorneys (Brandon, 1983). In private practice, the issues of employability, job compatibility, and labor market are often times the keys issues. Considering that many private rehabilitation clients have experienced a handicapping condition which impacts on their vocational functioning in some way, vocational evaluators, with their special areas of expertise in testing, counseling and job matching, would seem to be an important if not integral part of the process.

Consider the definition of vocational evaluation given the 10th Institute on Rehabilitation Services (1972): "Vocational (work) evaluation is a comprehensive process that systematically utilizes work, real or simulated, as the focal point for assessment and vocational exploration, the purpose of which is to assist individuals in vocational development. Vocational (work) evaluation incorporates medical, psychological, social, vocational, educational, cultural and economic data in the attainment of the goals of the evaluation process." We can only speculate why vocational evaluations as defined above and the vocational evaluators who provide these services are not more critically involved in private rehabilitation as expert witnesses. Whether it is the evaluator's historical subordination to the rehabilitation counselor as suggested by Mason (1983) or the evaluator's lack of aggressiveness in maintaining their domain in vocational evaluation (Ellis 1983), it is clear that the vocational evaluator has much more to contribute to the private practice of rehabilitation.

Evaluators are interfacing with proprietary rehabilitation in increasing numbers. Some wear two hats, both as evaluators and counselors in private firms. Others work in sheltered workshops, hospitals or proprietary assessment centers where litigated cases are seen for vocational evaluations. Thus the evaluator may be called as an expert witness. Lynch (1983) offers the following definition of the vocational expert: "Vocational experts are responsible for critically reviewing supporting documentation (e.g. medical or psychiatric); performing a vocational diagnostic interview; noting critical work behaviors; translating residual functional capacity into vocationally relevant terminology; selecting, administering, scoring and interpreting the appropriate assessment tools (e.g. tests of intelligence, achievement, aptitude, vocational interest, dexterity); locating, assessing, and integrating rehabilitation research relevant to the type of disability involved; understanding vocational development theory; job requirements, and the world of work; securing labor market and wage information; and presenting logical and substantial conclusions based on objective findings." It is in and around these issues that vocational evaluators can make significant contributions as expert witnesses.

## The Nature of Cases

The role of the vocational expert poses a unique set of considerations and challenges in both conducting the vocational evaluation and testifying in a court of law. One of the first considerations is the nature of the case. The majority of cases are worker compensation,.in which a worker has been injured on the job and the injury impacts on the worker's vocational functioning. In these cases, the rehabilitation involvement is directly related to the return to work hierarchy as summarized by Sink (1983).

1. The worker recovers from the injury and returns to work in the same job with the same employer without modifications.
2. The worker can return to work in the same job with the same employer with modifications.
3. The worker can return to work with the same employer on a different job without modifications at equal or better pay.
4. The worker can return to work with the same employer on a different job with modifications at equal or better pay.
5. The worker can return to work with a different employer at the same job without modification at equal or better pay.
6. The worker can return to work with a different employer at the same job with modifications at equal or better pay.
7. The worker can return to work for a different employer on a job in which he or she has never been employed, but for which he or she has transferable skills and formal retraining is not required.
8. The worker can return to work only if formal training is the only feasible alternative available and the worker has the ability to successfully complete the training.
9. The worker does not have potential for competitive employment.

Vocational evaluations may be indicated in level four (4) and levels seven through nine (7 - 9). In such instances the evaluator may be asked to determine the worker's ability to perform a new job with the employer, in which case a tailored evaluation specific to measuring the job requirements for a particular job is in order.

Often evaluators can play a critical role in the return to work with the employer by conducting an on-site visit to the employer, determining the hypothetical jobs the worker could perform, and evaluating the employee against these criteria. It is not uncommon for an employer to stereotype an employee as skilled only in the job he/she performed at time of injury. A good evaluator can point out alternative job slots the employer may not have considered. It is unlikely such a case would reach the courts on the issue of employability.

Most often, however, the evaluator will be asked to determine employment potential for new job or training areas. In these cases, consideration must be given to not only prior work history/skills but aptitudes, interests, temperaments, general educational development and physical capacities as they relate to generic job competencies and labor market opportunities. Since the evaluation offers an opportunity for extensive behavioral observations, information about the worker's functional work tolerances, return to work attitude and general work habits are important. Finally, for what jobs does the worker seem to be employable? Is the pay rate comparable to that at time of injury? If not, is the worker a candidate for training and what is the expected pay rate upon completion of training? Since each state has its own worker compensation laws, these issues may vary. Depending upon the law, evaluators may also be asked to calculate a vocational disability rating, determining advancement potential in an occupation or consider roll back wages.

Although worker compensation is the primary area for vocational evaluators as expert witnesses, there is a growing demand in the areas of personal injury, divorce, social security and long-term disability. Social security cases are distinctive in that employability opinions are based upon the availability of jobs in the national, not local, economy. Personal injury cases, although varied in referral purpose, generally focus on what the client's employability was before the injury, current employment options, and the impact of this over the life expectancy. These cases, by nature, tend to be more hypothetical and frequently are done in conjunction with an economist.

An emerging area of practice for the vocational evaluator is divorce. Since alimony is somewhat dependent on the spouse's present and future earning capacity, vocational evaluations are extremely helpful in determining vocational potentials for spouses who have never worked or who claims he/she cannot work. Often times the results of the vocational evaluation serve as the rehabilitation plan which is then awarded as part of the divorce settlement with anticipated earnings offset against alimony.

With an increase in litigation and use of vocational experts in general, there is a trend to use vocational experts for independent evaluations, trial consultation or rebuttal witnesses. Since the legal system is by nature an adversary one, opposing attorneys may find need to obtain an opinion about the rationale for a particular vocational evaluation, interpretation of test results, or conclusions and recommendations. This may range from simple review of records to conducting an independent evaluation followed by formal testimony. Although this concept is somewhat foreign in the vocational rehabilitation system, this is frequently seen, for example, in presenting medical evidence, where doctors called by each side present their opinions as to the reason for the onset of disability, differing recommendations for treatment, degree of disability, etc.

## Conducting the Vocational Evaluation

In conducting vocational evaluation, the following guidelines will be helpful if a court appearance is anticipated or required:

1. Develop a sound evaluation plan and rationale. As simple as this sounds, it is the single most overlooked aspect in a vocational evaluation. The purpose of the vocational evaluation should be to answer the referral questions which have been posed by the referral source. If no referral questions accompany the case, the evaluator should contact the referring party and determine the referral issues. The evaluation plan should reflect the most effective strategy for answering referral questions by collaborating existing information or discovering unknown information about the client. Avoid redundant testing or over testing as it gives the appearance of being undirected.
2. Thoroughly review referral material. Usually medical reports constitute the bulk of referral data. Since the vocational evaluator must consider the client's current and/or anticipated restrictions, request that some type of physical functioning form be filled out by the physician. Check that the medical information is current and ask the referral source to provide the date of the last examination. Nothing is more frustrating than to complete the evaluation report only to find out that a more recent medical examination defines different restrictions than those used in your evaluation.
3. Be thoroughly familiar with evaluation instruments. If norm reference tests are used, be certain the norms are appropriate. Know when to use performance based instruments such as work samples as opposed to paper-pencil instruments. Carefully screen your assessment instruments to assure that test content correlates with evaluation objectives and accepted psychometric standards for validity and reliability. It is not uncommon to be asked questions about validity and reliability coefficients of testing instruments.
4. Become familiar with the labor market. Vocational evaluation results are virtually useless if testing data is not linked realistically with vocational objectives. The Dictionary of Occupational Titles, the Occupational Outlook Handbook and state and local labor market publications provide a starting point for linking evaluation data to vocational objectives. The evaluator can be certain he/she will be asked how recommendations for jobs were made. These publications are the most widely accepted. Most effective, however, is first hand knowledge of the local labor market which can be obtained from job placement experience, visiting local employers or schools, reviewing the want ads and/or visiting the employment office. This area is one of the weakest skill areas in most evaluation programs (Ellis, 1983). Computerized job bank and job match programs make the job immeasurably easier.

5. Write every report as if it were going to court. In litigated cases one can be sure that reports will be scrutinized by one or more attorneys if not a judge, jury and/or arbitrator. Records can also be and often times are subpoenaed, including case notes and raw data. Take care not to write subjective comments, non-case relevant notes or "doodles" on any case records. It can be embarrassing to have one's artwork displayed before judge and jury. Reports themselves should be as objective, accurate and clear as possible. Remember that the reader will probably have the greatest opportunity to clinically observe the client during the evaluation process than other professionals. Therefore, objective and carefully recorded observations about motivation, functional vocational tolerances, learning ability and

work style are unique contributions from the evaluator.

### Courtroom Survival Techniques

Very few individuals relish the prospect of taking the witness stand, situated as it is between two opponents, an imposing looking judge and in some cases a jury of thirteen fellow citizens. However, in this increasingly litigious society, vocational evaluators can expect to find themselves in court either as a result of expanded areas of practice or subpoenaes. Since this is a relatively new terrain for rehabilitation providers, especially vocational evaluators, the following tips may help in surviving and even enjoying the experience.

1. Never blame attorneys for being attorneys. One must recognize the legal system for what it is--an adversarial one. When a case goes to court it is because there is a dispute. Attorneys are representing each side of the dispute, advocating the greatest degree possible for their client. It is just as much the opposing attorney's responsibility to point out the weakness of the expert's testimony as it is the expert's attorney to draw out the strong points. That is their job, just as it is the expert's job to impart his/her expertise. It is critical to understand this and to not take the courtroom experience personally.
2. You are the expert. The Vocational Expert is being called because he/she possesses a special body of knowledge. It is important that the retaining attorney understand your area of expertise as well as your limitations. For this reason it is highly recommended to meet before the trial to explain the vocational evaluation, conclusions, recommendations, etc. It is also helpful to ask for an overview of the questions that will be asked on direct examination and anticipated questions on cross examination. When speaking to the judge and/or jury, remember they are probably not familiar with vocational evaluation. It is your responsibility to communicate in understandable terms your procedures and findings and, if necessary, to educate them about your profession. As one arbitrator once related, "You know, we didn't understand x-rays when they first came out either."
3. Be prepared. Preparation begins with the day the case is received, starting with developing the evaluation plan, through testing, report writing and testimony. Although it is not necessary to memorize the report and all test manuals (it is usually permissible to refer to notes) there is no substitute for being thoroughly familiar with case data, general test content/technical information, significant data, and most of all, rationale for findings. Equally important is to be aware of what areas are out of your expertise. It is not uncommon for the opposing attorney to ask leading questions to entice the rehabilitation specialist to answer questions out of their area, mainly along medical lines. Expert witnesses who fall prey to this technique appear less credible. It is preferable to respond that you don't know the answer to a question or that it is not in your areas of expertise.
4. Qualifications are important. Prior to giving testimony the witness will be asked to give qualifications to demonstrate that he/she actually is a vocational expert. Questions about education, special training, relevant employment history, professional affiliations, presentations and publications will be asked. Since the vocational expert is a relatively new witness in the legal system, those vocational evaluators planning to enter this field should maintain certifications such as CVE, CRC, attend seminars and workshops, and maintain relevant

professional affiliations. A curriculum vitae is necessary and may be placed into evidence in view of verbal qualifications. However, it is often perferable, in jury trials especially, for the jury to hear qualifications verbally, as it creates a core credible atmosphere.

5. Appearance makes a difference. As is true in most situations, first impressions are important in court proceedings. Almost without exception, witnesses should wear a business suit of a conservative nature. The same applies to make-up, hair style and accessories. An air of confidence and poise communicates competence. Pretrial jitters are normal and can be diminished by being well prepared. Good eye contact with the judge, hearing officer or jury is important. Remember, they are the recipient of the evidence. It is the evaluator's responsibility to present the information clearly, competently and sincerely. Following this, the judge or jury weighs the evidence in consideration of all other testimony and they make the decision.
6. Take the time to learn about the legal system. As evaluators, we are relatively isolated from the proceedings in a court of law, whether it be an arbitrator's room, a judge's chambers or a court room. If evaluators are to appear in these settings it is imperative to understand the basic dynamics such as direct and cross examination, re-direct and re-cross as well as the distinct roles of the witnesses, attorneys, and judge or hearing officer. Although space does not allow an elaboration of these points, a basic law book, or better yet, an inservice from a local trial attorney would be very beneficial in learning about the trial system.

### Summary

It is this writer's opinion that the vocational evaluator has a great deal to contribute as an expert vocational witness. Our unique skills in behavioral observations, vocational diagnostics, and job matching meet the needs that are most frequently required of a vocational witness--determining employability issues. However, up until this point, evaluators have had their heads in the sand regarding the advocation and marketing of our profession to new referral sources, sources such as the insurance industry and those requiring expert vocational witnesses. Furthermore, vocational evaluators have shown deference at best, if not apathy, towards other professions which have adopted the term "vocational evaluation" to describe services such as a transferability of skills analysis, a rehabilitation interview, or even a simple file review. There is also a trend for professionals such as occupational therapists and, to a more limited degree, rehabilitation counselors, to perform vocational evaluations. In this writer's opinion, such use of evaluation will serve only to dilute the profession. Evaluators need to take a much more aggressive stand in educating, marketing and protecting the domain of our discipline. Otherwise, we run the risk of becoming an endangered species.

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# SCHOOL-BASED VOCATIONAL ASSESSMENT: A COMPREHENSIVE, DEVELOPMENTAL APPROACH

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**ABSTRACT:** In the last fifteen years, as special needs students have been increasingly involved in career education and vocational education programs, utilization of vocational assessment has increased. However, while models have been developed and solidified in rehabilitation (Nadolsky, 1972, 1973; Baker & Mercer, 1974), models for vocational evaluation and assessment of special needs students in school settings are still in great flux. There are significant questions and disagreements concerning; what is to be assessed, for what purpose, what recommendations and other outcomes should be available, who is assessed, by whom, when assessment is to be done, when it is implemented, and how often (Peterson, 1981, 1983).

Two basic approaches are seen in the literature: (a) curriculum-based vocational assessment, (b) vocational evaluation centers. It is the purpose of this article to briefly describe each approach, consider the strengths and weaknesses of each, and to propose an eclectic model that provides a comprehensive, developmental approach to vocational assessment that combines the most useful aspects of each model.

## Curriculum-Based Vocational Assessment

Curriculum-based vocational assessment refers to the use of existing school resources to obtain vocational assessment data about students. Such an approach has been advocated by an increasing number of writers as being a cost-effective method for obtaining vocationally relevant data from the regular school environment in a way that maximizes its likely impact on instruction and curriculum (Stodden, 1980; Clark, 1972; Patten, 1981; Posey, 1982; Peterson, 1980; Sitlington, 1978; Phelps, 1984). Curriculum-based vocational assessment is usually considered to begin no later than late elementary school and to continue through the student's public school career. During the vocational and career development of the student, information is gathered at the various stages of orientation, exploration, and preparation (Phelps, 1984) and used to develop IEP's that facilitate career education and vocational development.

The methods used to gather information in curriculum-based vocational assessment are multiple and varied. The fact is that a rich source of assessment data is available in school settings. However, such information is most often not interpreted in light of vocational development. Methods may include those listed in Table 1.

Curriculum-based vocational assessment has both significant advantages and disadvantages. On one hand, gathering vocational assessment information from existing curriculum and special education testing procedures can be very cost effective. On the other hand, the danger exists that, depending upon the pre-vocational and exploration curricula of a particular school, a student may not have an opportunity to manifest vocationally relevant skills and interests.

Implementing curriculum-based vocational assessment also requires attention to personnel considerations.

Some individual--whether a full-time vocational assessment specialist, vocational counselor, school psychologist--with both the time and skills in vocational assessment must coordinate the process. This individual must be actively involved in setting up a process, training teachers and counselors to use checklists and other instruments, and helping educators to use information to develop IEP's.

Table 1

Methods of Curriculum-based Vocational Assessment

Special Education Classes
  *Checklists of vocational and prevocational skills
  *Interest assessment
  *Student and parent interviews
School Records
Special Education Testing and Assessment
  *Psychological, educational, social
  *May include interest and aptitude assessment
Prevocational Classes
  Checklists of interest and vocational skills from:
  *industrial arts
  *homemaking
  *occupational orientation, etc.
Physical Education Classes
  *Checklists of physical skills
Vocational Education Classes
  *Performance assessment
  *Vocational classroom tryouts

## Vocational Evaluation Center Model

Vocational Evaluation Centers involve a centralized location where in-depth vocational assessment and counseling occurs. Vocational Evaluation Centers may serve a regional area, be housed in mobile units, or be implemented in coordination with other agencies. Methods usually emphasize the utilization of "work, real or simulated, as the focal point of assessment" (VEWAA, 1975) including: career exploration, vocational aptitude and interest testing, physical skills assessment, work samples, and situational assessment including vocational classroom tryouts and job tryouts.

The actual process for centers located in schools is very similar to that described by Nadolsky (1972). However, some significant differences occur. These include a greater emphasis on vocational evaluation to recommend skills training (Pertri, 1980; Peterson, 1981), utilization of vocational classroom tryouts and work samples based on vocational training programs (Wrobel, 1976; Lake, 1974), and utilization of vocational evaluation as part of a comprehensive support service approach for special needs students (Leconte & Roebuck, 1981). Specific examples include Project Serve (Wrobel, 1976) and Vocational Support Service Teams utilized in Maryland (Marshall, Emerson, & Bailey, 1981). Laconte and Roebuck (1981) described vocational evaluation as implemented in Maryland schools as having an advocacy role in which the results of vocational evaluation are actively communicated to parents and educators and follow-up concerning the implementation of recommendations from the vocational evaluation process is provided.

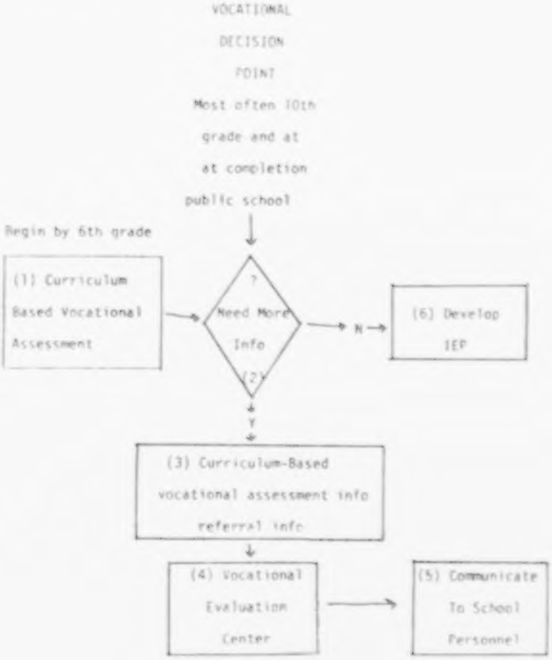
Vocational evaluation centers also have significant advantages and disadvantages. They potentially provide an extremely valuable opportunity for students to experience a variety of occupations and be assessed relative to skills needed in those occupations. Such programs have been shown to have dramatic impact on student attitudes, motivation, and self-concept (Menz, 1978). Additionally, vocational evaluation specialists act as highly competent support service personnel who can advocate for appropriate services for handicapped students (Leconte & Roebuck, 1981). On the other hand, Vocational Evaluation Centers are expensive and can be too far removed from actual instructional personnel.

## Comprehensive, Developmental Approach to School-based Vocational Assessment

This paper suggests using a combination of the two approaches above to draw on the strength of each and provide an on-going, developmental assessment process. The approach is graphically illustrated in Figure 1 and can be summarized as follows:

Figure 1

Comprehensive, Developmental Approach to School-Based Vocational Assessment



1. Curriculum-based vocational assessment should start in the sixth grade and be interactive with instruction. Information gathered during these years should guide IEP development relative to career orientation and exploration, prevocational skills, work behaviors, and functional living skills.

2. At major vocational decision points, such as the year prior to potential entrance into vocational education, the interdisciplinary team decides if more information is needed. If so, additional vocational assessment is scheduled which may include referral to a Vocational Evaluation Center. More information should be sought if information is not adequate to inform the vocational teacher on how to work with a student or if it is unclear or doubtful that a student has the ability to succeed in a vocational program.

3. If a referral is made, the "Curriculum-based Vocational Assessment Specialist" will compile vocational assessment data gathered to date and provide specific assessment questions. This helps center personnel to not duplicate information already gathered and to focus in on what yet needs to be done.

4. A vocational evaluation is implemented that is based on the needs of the student. Note that using a center does not at all prevent the use of vocational classroom tryouts, job tryouts, etc., as part of the evaluation process. Such methods have been used to especially good advantages in school situations (Wrobel, 1978).

5. Active methods are used to communicate vocational assessment information to instructional personnel so that IEP's and individual classroom plans may be based on this information. Various mechanisms have been used for this purpose. These include: (1) interdisciplinary team meetings following vocational evaluation, (2) development of summary reports sent to teachers and parents outlining results and implications (Patten, 1981), (3) use of liason vocational assessment counselors who help interpret vocational assessment results in IEP meetings at a student's home school, and (4) follow-up on recommendations made in vocational evaluation reports (Leconte & Roebuck, 1981).

Vocational assessment--whether curriculum-based or in vocational Evaluation Centers--must pay attention to several key principals. These include:

(1) Use of work, real or simulated. The more like real work, the more valid and useful are the results.

(2) Assessment must be instructionally relevant. Student learning styles and abilities must be assessed and clear pictures of student strengths and needs must be developed using a program related assessed model. Thus vocational assessment should result in recommendations that include program placement, data for specific objectives in a program, and suggestions for useful instructional and behavior change techniques. More specifically, recommendations may include: vocational education programs, job placement, support services and community programs, teaching techniques and vocational curriculum modifications, vocational information and exploration experiences, work adjustment training, academic course selection and functional living skills training (Peterson & Hill, 1982).

Several writers have attempted to blend a model of vocational assessment that utilizes the strengths of both curriculum-based vocational assessment and vocational evaluation centers. To this end, the Texas Education Agency (1979) developed guidelines concerning vocational assessment in which three levels of assessment were described: (a) Level 1 Vocational Assessment involved the use of existing student records and diagnostic data such as special education assessment, (b) Level 2 involved the use of basic vocational interest and vocational aptitude assessment, and (c) Level 3 was entitled "Comprehensive Vocational Assessment," or "Vocational Evaluation." Peterson and Hill (1982) in Project Voc-AIM developed a manual for the Texas Education Agency that described for public schools the methods used to implement this process of vocational assessment. Peterson (1984) working with a national task force on vocational assessment of special needs students, developed a monograph which described a "basic vocational assessment" and "comprehensive vocational assessment." Pennsylvania (Department of Education, 1983) developed a process of curriculum-based vocational assessment which also allowed the incorporation of vocational evaluation centers as needed. Posey (1982), and others, described a similar model for use in Arizona.

## Personnel in School-Based Vocational Assessment

To implement the comprehensive model described above requires trained personnel. Vocational Evaluation Specialists must be available to vocational evaluation centers and trained personnel must function as curriculum-based vocational assessment specialists. Depending upon specific school situations, these functions could be performed by the same person.

Table 2

Personnel Roles in a Comprehensive, Developmental Approach to School-Based Vocational Assessment

| Vocational Assessment Specialist | Curriculum-Based | Vocational Evaluation Center |
|---|---|---|
| *Vocational Counselor<br>*Vocational School Psychologist<br>*Work study coordinator<br>*Rehabilitation evaluator | Analyze vocational skills in school curriculum<br>Develop and coordinate input by teachers, parents, etc. | Analyze requirements of jobs, voc ed classes, etc.<br>Assess students using tests, work samples |
| | --Coordinate vocational-- class tryouts<br>--Consult with teachers-- and parents concerning vocational IEPs, support services, curriculum modifications<br>--Analyze and interpret-- vocational assessment information | |

(table continues)

Table 2 (cont.)

| School-Based Vocational Assessment Team | Curriculum Based | Vocational Evaluation Center |
|---|---|---|
| Special Education Teacher | Assess vocationally relevant skills | |
| Vocational Education Teacher, etc. | Use results to help develop career oriented IEP ↔ | Use results to develop vocational IEP |

Additionally, vocational counselors, school psychologists, or other appropriate school personnel could implement and coordinate curriculum-based vocational assessment. Clearly, however, such individuals must have skills in vocational assessment. The roles and functions of curriculum-based and vocational evaluation center-based assessment specialists are similar; but there are some differences. These are indicated in Table 2. Finally, assessment team members--teachers, counselors, school psychologists, etc.--must be trained both to participate in the vocational assessment process and to use its results in IEP development.

## Relation of Special Education Assessment and Vocational Assessment

A final important note should be made that vocational assessment and existing special education assessment should be overlapping, coordinated processes. Too often these are developing as two, uncoordinated systems implemented by two sets of personnel who may or may not actively communicate. The vocational school psychologist movement (Hohenshil, Shepard, Capps, 1982) may assist in the development of a coordinated system. At least one vocational evaluation center (Patten, 1981) has been staffed by school psychologists who are also trained Vocational Evaluation Specialists. When vocational evaluation is implemented, assuming the schedule is appropriate, a student's re-evaluation is implemented for special education.

## Conclusion

This article has provided an overview of a comprehensive, developmental approach to school-based vocational assessment. The purpose of the model outlined in this paper is to actualize an assessment system to provide data upon which vocationally oriented IEP's may be developed in a cost-efficient manner and in a way that maximizes the opportunities available to handicapped students. The result will be better services and ultimate employment for handicapped students.

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# ASSESSMENT TECHNIQUES WITH THE LEARNING DISABLED STUDENT

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**ABSTRACT:** Providing reliable and valid assessment data for special populations requires a number of alternative approaches to assure that individual vocational needs are addressed appropriately; this is particularly relevant for learning disabled students. Techniques employed with other populations are ineffective or even detrimental with learning disabled students. This article presents pragmatic techniques to facilitate the total assessment process with this population. Questions concerning commercial assessment system design and established strategies are raised for consideration.

The Education of All Handicapped Children Act (PL 94-142) in 1975, resulted in vocational assessment services for the special needs population. Under this regulation, the Federal government identified categories of handicapping conditions, including the learning disabled (LD), and mandated the implementation of special education and related services.

Determining effective assessment service delivery for LD students requires that the evaluation specialist carefully examine established assessment models. Traditionally the ultimate goal of the rehabilitation model has been job placement. However, the emphasis for providing assessment services in the school setting has been on career development and placement in vocational programs. Furthermore, the relative importance of determining task-related abilities is diminished by the need to identify learning styles and effective modes of instruction.

There has been an ever-increasing amount of literature concerning various teaching strategies, remedial approaches, and theories of learning styles with LD students (Lerner, 1981; Hresko & Read, 1981). However, there is little research available germane to specific vocational assessment techniques necessary with this population. Strategies and methodologies that produce positive results in the classroom may have questionable bearing on a student's work performance. Therefore, a unique technique-oriented approach must be implemented in vocational assessment that is specific to the LD student. According to McCray (1982), typically the comprehensive vocational evaluation center has a distinct eight-step systematic approach. For the purposes of this paper, three steps require special considerations when assessing a LD student. These steps are orientation, initial interview and formal testing/feedback.

A majority of the literature has supported the position that a thorough explanation of assessment procedures contributes to evaluee participation, reduces confusion over poor performances, and provides greater awareness for the benefits of the assessment process (McCray, 1982; Hursh, 1984). However, different methods of explanation promote a greater degree of comprehension with LD students. Depending on the specific learning disability, certain methods will not facilitate the student's comprehension of the assessment process.

Consider this example. It is the first day of the assessment process and all of the referred students are present. They are all male, fourteen years old, ninth graders, and diagnosed as LD. The referral information indicates that three of the students have auditory perceptual problems. Two other students experience shortened attention spans with visual perceptual problems. In addition, all eight students are dysgraphic. With the myriad of known and possibly unknown learning disabilities present within this group, is it feasible to expect that a single method of explanation for the assessment process will promote participation, reduce confusion, or provide a learning experience.

The most effective approach to providing all the students with a conceptualization of the assessment process requires an eclectic method. This method must incorporate a brief narration for students having visual perceptual problems, visual cues for students having auditory perceptual problems and a variety in delivery to increase attention span. Specific techniques which address individual needs include (a) a brief explanation with introduction and inquiry as to perception of the (assessment) process, (b) a slide show (approximately ten minutes), and (c) an abbreviated tour of the assessment center.

The rationale for the brief explanation of vocational assessment is to orient the students to the situation. Brevity in delivery is of prime importance. Students having short attention spans, in addition to auditory and perceptual difficulties, are not able to process all the information the evaluation specialist needs to impart to them. Seeking their perceptions of the assessment process promotes student involvement and dispels any misinformation that may have occurred during the initial phase of the orientation or from previously evaluated students.

The need for a slide show permits variety in presenting an overall picture of the assessment process. It also allows the students time to adjust to the environment without having any immediate demands being placed upon them. Furthermore, the slide show is a rather concrete portrayal of the expectations of the assessment process. It should not be a commercially marketed product. Students are not interested in slides showing examples of vocational assessment to job placement, or slides showing adults being evaluated. A slide show developed in-house is a more effective means for relaying the purpose of assessment. The slides should show examples of work samples which the students will be required to perform on with subsequent slides showing a "real-world" situation. For example, a slide showing a student performing on the Valpar Whole Body Range of Motion work sample should be followed by a slide showing a student working overhead on an automobile. This decreases the student's perception of assessment as being abstract and useless.

Providing a brief tour of the center permits the students to recognize the work samples from the slide show and to formulate how they will interact with them during the actual process. It also allows the student to become oriented to the physical plant and ask questions.

A short fact sheet with the rules and regulations governing the operation of the center reinforces any previous comments. To assure that there are no misunderstandings concerning behavioral expectations, it is best to review the fact sheet in a group setting.

As a final item of note, there must be a distinction between the roles of the evaluation specialist and the special education teacher. The evaluation specialist's role is to simply interpret their vocational potential as it relates to learning styles, demonstrated aptitudes, instructional modes and work behaviors. It is not to teach the student new vocational skills. Many of the LD students have been in the same self-contained classroom situation for a number of years and are aware of the special attention given to them. They may attempt to manipulate their environment and the evaluation specialist by feigning that their learning disability prevents them from performing in the instructed manner (Kleinhammer-Framill, Framill, Schrepel, & Davis, 1983). To assist LD students to adjust to the work environment, they should be made aware that they will not be identified as learning disabled upon securing employment.

Perhaps the most tedious task for the LD student is the written initial interview. In the example of all eight students experiencing dysgraphia, this is a particularly difficult request. An effective manner in facilitating the student's responses to the questions is to verbally recite each item. Having an evaluation aide present to provide individual assistance is extremely useful. If the extent of a student's difficulties appear to the degree that one or more are lagging far behind the group, an oral interview is more appropriate. Having a chalkboard readily available allows the evaluation specialist to assist with spelling difficulties. Items on the chalkboard which can be of particular use are the current date, the correct spelling of the high school that the students attend, their bus number, the evaluation specialist's name, and the schedule for lunch and break.

There are few commercially available assessment tools which appropriately address the vocational potential of the LD student. Vocational assessment within the school setting must rely on modifications and adaptive measures to provide adequate, valid assessment services. Some of these modifications include the use of tape-recorded instructions, equipment that visually matches the instructional material, a highly structured assessment environment, and use of the VITAS, TAP and COATS work sample systems. Students diagnosed as experiencing visual perceptual problems cannot be expected to perform well on work samples requiring the use of written instructions. This becomes a monumental task, particularly with the student having a lack of visual sequential memory. A practical measure to alleviate the detrimental effect of the students specific learning disability is to permit the use of tape-recorded instructions. As with all modifications to the administration of commercial work samples, the evaluation specialist should not utilize published performance criteria. Several standard psychometrics offer tape-recorded instructions with their test booklets. One such example is the Bennett Mechanical Comprehension Test (BMCT). Again, to assure that the vocational potential of the student is appropriately assessed, the development of locally gathered norming data is strongly encouraged. In furthering the objective of assessing the LD student as accurately as possible, providing equipment that visually matches the instructional material cannot be stressed too strongly.

Students having visual perceptual problems may rely on visual cues to cope with their environment. A good example is a work sample which requires hand tools, such as the COATS small engine servicing work sample. The audiovisual instructions show a red-handled screwdriver being used to remove an oil plug. If a student with visual perceptual problems is subsequently given a yellow-handled screwdriver during his assessment, he may request assistance because he used the red handle as a visual cue.

Another problem for the LD student which is typical of most young adults is the need to socialize. LD students are generally not aware of subtle social cues and particularly, are not sensitive to appropriate work behaviors. Often a student becomes distracted by external stimuli and cannot adjust to the freedoms of the assessment center. As a result, the student requires a closely supervised environment. A compensatory method is to invest in movable sound screens or design the center with a "quiet room" to isolate and separate the students.

Finally, there is the need to examine the appropriateness of commercially available work sample systems. Most of these systems do not have performance criteria for the LD student. However, the extent of modification required for the VITAS, TAP, and COATS systems is minimal.

The VITAS system provides a one-time practice before independent performance. The assessment specialist should develop parallel practices and gather norming data. Further, the student's conceptualization of the task may be extended with an explanation from another student.

The TAP system's appropriateness can be enhanced with practice and re-administration of the work samples. In this manner, the assessment specialist can extrapolate information as to some degree of separation of learning from performance. Although the COATS system utilizes an audiovisual format, it provides the student with an array of occupational information. An audiovisual format may pose certain problems for the LD student. Nonetheless, providing a replay unit and a manual with individual frame instruction can minimize most problems. This combination of work sample systems should allow the evaluation specialist greater confidence in interpreting the vocational potential of the LD student. It by no means implies that these modifications need only be implemented and adequate systems of measure are readily available.

At the present there are no assessment systems developed specifically for the LD student. As the impact of Federal regulations defining learning disabilities as a handicapping condition permeates the fields of rehabilitation and education, assessment tools will have to be developed accordingly.

The intent of this paper was two fold. First, it was to alert the evaluation specialist to techniques which are currently applied in vocational assessment of LD students. Second, to show the deficit in the designs of commercially available systems when used with the LD population. The evaluation specialist must seek out, develop, and validate in-house methodologies until adequate systems become available.

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# A MODEL VOCATIONAL EVALUATION PROGRAM FOR THE LEARNING DISABLED ADULT

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**ABSTRACT:** Traditionally, learning disabilities (LD) have been viewed as handicapping conditions remediated upon completion of the educational process. However, current literature indicates that there are life-long vocational and social implications for the LD adult. Deficits in perceptual abilities, academic skills, and psycho-social skills typically hinder the LD adult in obtaining job-specific vocational skills which often result in unemployment or underemployment. In order to assess such limitations, a comprehensive evaluation is required. A cooperative effort between the Sparks Center for Developmental and Learning Disorders and Vocational Rehabilitation Services (VRS) has resulted in wholistic model utilizing an interdisciplinary approach to assessment of the LD adult. Interdisciplinary consultation provides information concerning physical, medical, nutritional, language, hearing, visual, educational, psychological, social, and vocational aspects. The variety of measurement instruments employed yield information regarding psycho-social skills, perceptual organization, literacy, and language function as well as worker skills and work habits. Collaboration between the Sparks Center team, the VRS counselor, the individual, and the family enhances the overall effectiveness of vocational planning for this target population.

Through the years, handicapping conditions have been of concern to a variety of health and human service professionals. Research regarding the impact of these conditions on all aspects of exception to this has been the research pertaining to life-long implications of specific learning disabilities. Since the 1960's, substantial resources have been directed toward the learning disabled (LD) population; however, this has occurred largely within educational settings. Indeed, learning disabilities have traditionally been considered educationally handicapping conditions of childhood. However, professionals in the human services, most notably rehabilitation services, have become increasingly aware of the frequently multitudinous obstacles faced by the LD adult. Deficiencies in intellectual functioning, perceptual abilities, social skills, academic achievement, and personal maturity have hindered LD adults in successful vocational and social adjustment (Cronin & Gerber, 1982). LD adults have typically experienced underemployment or unemployment as a result of such dysfunctions. This has posed a need for a comprehensive or wholistic model of vocational evaluation subsequent to vocational planning for LD adults. In an effort to identify and respond to the various needs of learning disabled adults, a cooperative effort between the Sparks Center for Developmental and Learning Disorders and Vocational Rehabilitation Services (VRS) has resulted in such a wholistic model of assessment for the adult learning disabled population.

The Adult LD Project at the Sparks Center has based its services on a multidisciplinary approach to assessment. Though the major focus of the Project has been adjustment oriented, vocational evaluation has provided the basis for vocational planning and subsequent adjustment/transitional services. The wholistic model employed in vocational evaluation has drawn upon a wide spectrum of expertise at the Sparks Center. LD team members have consulted with the Divisions of Psychology, Social Services, Nutrition, and Vision Function regularly. Additional consults have been provided by other divisions as necessary: Medicine, Speech and Hearing, Physical Therapy/Occupational Therapy. Information from these disciplines has provided an extensive data base for more in-depth assessment of functional assets and limitations as related to vocational success.

## Review of Literature

A review of literature has indicated various factors contributing to successful school and vocational adjustment. These factors included social adjustment, vocational training, and academic competencies. However, the LD adult continued to manifest deficits in each of these areas.

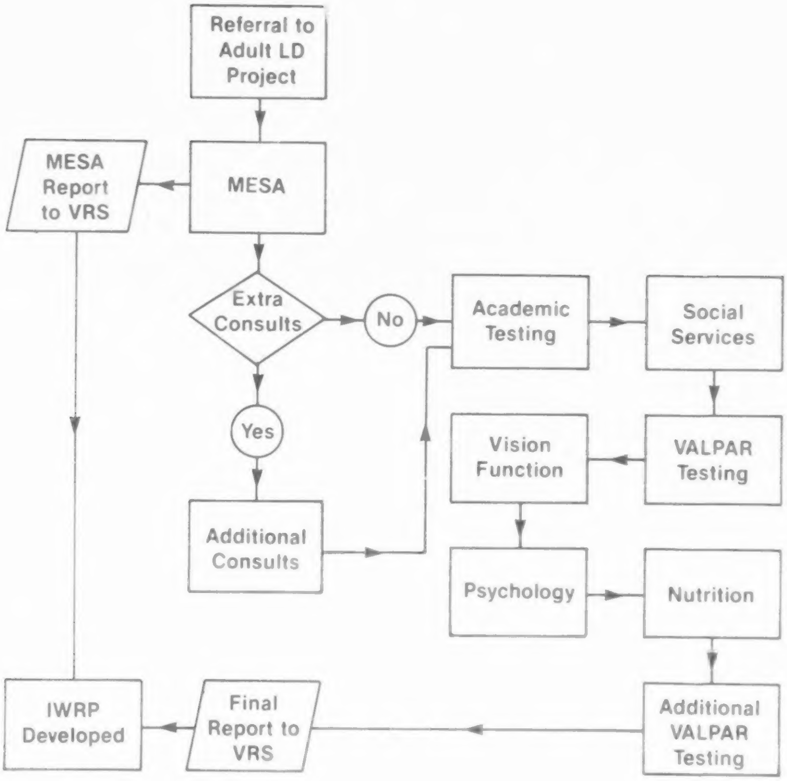
Sherbenou and Holub (1982) stated that academic deficits (reading, math written language, spoken language) were common in all LD adolescents. These academic deficits persisted in adults (Blalock & Dixon, 1982) thus interfering with social and vocational success (Faford & Haubrich, 1981) since they influenced future training and employment.

Although some LD adults developed appropriate social skills and positive self-concepts, emotional instability was a major manifestation in LD adults (Blalock & Dixon, 1981); Sherbenou & Holub). Emotional turmoil was often reflected in unemployment or under-employment (Crimando & Nichols, 1982). Deficiencies in social perception frequently acted as a catalyst for problems in interpersonal relationships (Axelrod, 1982; Minskoff, 1980; Sherbenou & Holub, 1982; Wanat, 1983) which threatened successful vocational and social adjustment. Indeed, many (Kronick, 1978; Lerner, Evans and Meyers, 1977) believed poor social adjustment to be more disabling than academic dysfunctions in LD adults.

In addition, LD adults were often occupationally immature since their exposure to career education was limited or non-existent. As a result, the LD adult frequently developed unrealistic vocational aspirations due to unfamiliarity with basic job requirements. If a realistic vocational choice were designated, though, the LD adult often demonstrated ineptitude in developing plans to attain those aspirations. This indicated the need for career awareness and vocational counseling for successful transition to adult life for the learning disabled (Fafard & Haubrich, 1981; Lerner, et al. 1977; Sherbenou & Holub, 1982). Since career knowledge as well as academic and social competencies greatly influenced vocational success (Cronin & Gerber, 1982), various assessment needs were identified.

Since a learning disability was such a multi-dimensional condition, evaluations were required by various disciplines to identify the particular traits manifested by the LD adult. Cronin and Gerber (1982) suggested that this evaluation process consist of medical examination, a psychological assessment, a social assessment, and educational testing. In addition, a vocational assessment was considered a critical facet in this evaluation process since it assessed vocational interest, aptitude and work traits. This interdisciplinary approach to assessment required measures of adaptive behavior (Patton & Polloway, 1982), social skills, vocational academics, and functional daily living skills (Sherbenou & Holub, 1982.) In addition, the use of work samples (commercial and informal and behavioral observation was recommended in assessing work related skills and functional competencies. Information from such an interdisciplinary approach could then be utilized in career/vocational planning with LD adults (Cronin & Gerber, 1982; Sherbenou & Holub, 1982.)

FIGURE 1



## Description of Model

As stated previously, the Adult LD Project at the Sparks Center routinely utilized assessment techniques offered by the Divisions of Psychology, Social Services, Nutrition, Vision Function, and Special Education/Vocational Rehabilitation. Consultation was provided as needed with the other divisions. Each division has identified a variety of standardized and informal measures:

Division of Psychology - Wais-R, MMPI, Zung, Beck

Division of Nutrition - completion of informal food intake

Division of Vision Function - assesses visual acuity, Bender Gestalt, Test for Visual Analysis Skills, Money Road Map Test, Koppitz Visual Aural Digit Span Test, Getman-Henderson-Marcus Visual Memory Test, Test for Auditory Analysis Skills, King-Devick Saccade Test

Division of Special Education/Vocational Rehabilitation - Wide Range Achievement Test (WRAT), Stanford diagnostic Reading Test (SDRT), Stanford Diagnostic Mathematics Test (SDMT), an informal written language assessment, Microcomputer Evaluation and Screening Assessment (MESA), selected work samples from the Valpar Component Work Sample Series

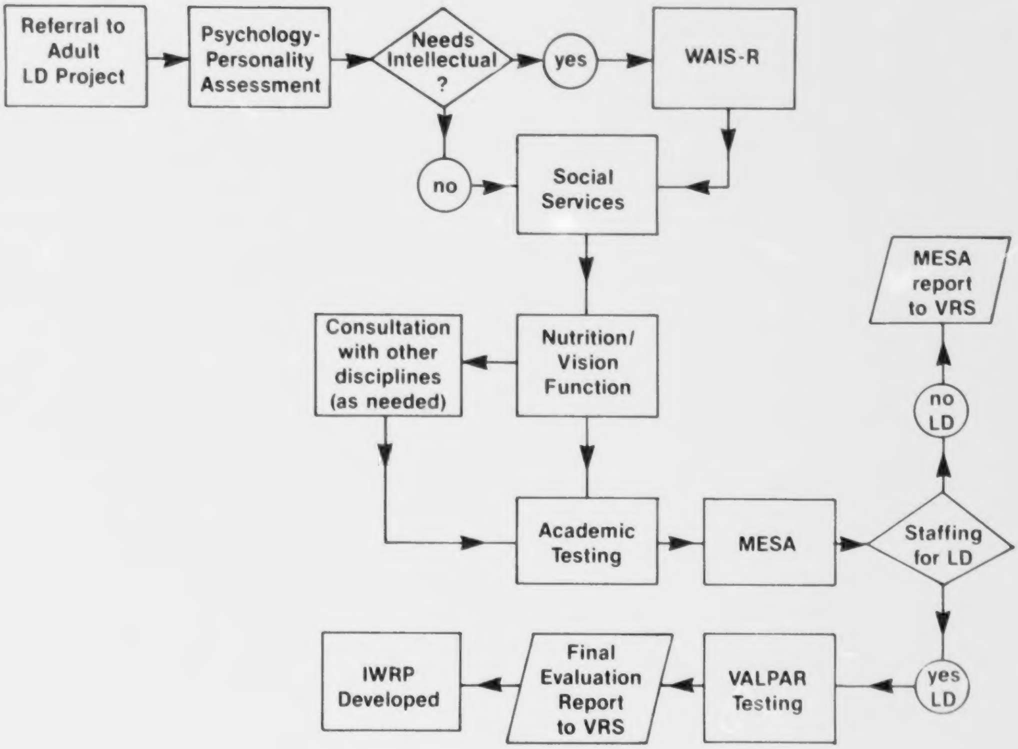
Division of Social Services - a comprehensive social services interview

The Adult LD Project evaluation required four to six days. A group of four referrals was able to proceed through the evaluation. Divisional information obtained from the various assessments was utilized in determining the presence of a learning disability and the implications of the learning disability on the subject's personal and vocational competencies (See Figure 1).

The Division of Special Education/-Vocational Rehabilitation (SE/VR) initiated the evaluation process by providing a brief orientation to the activities to be encountered in the LD Project evaluation. Included in this orientation was a brief discussion of learning disabilities and their vocational implications. After this informal orientation, testing was then initiated utilizing the Microcomputer Evaluation and Screening Assessment (MESA). Administration of the MESA yielded information regarding functional academics, eleven different aptitudes, tool use, physical mobility, general strength, vocational interest and awareness, and speaking skills. A worker profile was then generated from the preceding information. This profile was then utilized the following day in an LD Project prestaffing to identify assessments or consultations required with other divisions and to determine appropriate work samples for further testing.

The clients then saw the Division of SE/VR and the Division of Social Services on the third day. The Division of SE/VR conducted academic testing that yielded information regarding the type of training and employment the client would be able to obtain as well as proficiency in independent living skills (banking, budgeting, consumer shopping, completing job applications, etc.). That afternoon, the division of Social Services conducted an intake interview to obtain information regarding medical history, educational training, work history, and social involvement. Social skills are observed

FIGURE 2


Referral to Adult LD Project
Psychology-Personality Assessment
Needs Intellectual ?
yes
WAIS-R
no
Social Services
MESA report to VRS
Consultation with other disciplines (as needed)
Nutrition/ Vision Function
no LD
Academic Testing
MESA
Staffing for LD
IWRP Developed
Final Evaluation Report to VRS
VALPAR Testing
yes LD

and any expressed anxiety or depression was further explored.

The next two days were once again devoted to testing with the Division of SE/VR to administer selected work samples from the Valpar Component Work Sample Series. The work samples yielded information regarding work behaviors and work skills. In addition, the Division of Vision Function performed evaluations that assessed visual acuity and visual perception.

The Division of Psychology and the Division of Nutrition were assigned the last day of the evaluation. The Division of Psychology provided intellectual functioning and personality factors such as depression, stress, anxiety, or aberrant behavior that may interfere with successful job performance. That afternoon, the Division of Nutrition completed an intake form regarding the client's nutritional status.

The subsequent week of an LD evaluation, test results were reviewed in a staffing to determine the presence of a learning disability. In addition, the implications of the learning disability on the client's vocational aspirations was discussed. LD Project staff would then develop recommendations regarding adjustment services, job readiness training, vocational objectives, and job placement. The evaluation results and recommendations would then be relayed to the client in a conference. The VRS counselor, the parent, and staff members from other disciplines were invited as needed. The VR counselor then utilized the evaluation results and recommendations to develop vocational objectives and formulate an Individually Written Rehabilitation Plan (IWRP).

## Summary and Critique

Although this model provided critical information for diagnosis and vocational planning, it was evident that some changes were necessary. The cumbersome sequence of interdisciplinary evaluations was often confusing to clients as well as team members. Further, a number of referrals to the project were later found to be not LD yet extensive resources were utilized in a comprehensive assessment. Many of these clients were more appropriate for placement elsewhere for these services. Also refinement in assessment techniqueswas initiated.

Although the program continued to utilize a two week timetable for evaluation, a primary alteration occurred in the sequence of interdisciplinary assessments (see Figure 2).
Other refinements in the evaluation process included changes in the educational measures utilized for assessment of academic achievement: The Test of Written Language (TOWL) was substituted for the informal sampling of written language and the WRAT was eliminated for further streamlining. In addition, vocational testing began the following week with administration of the MESA. After MESA testing concluded, an interdisciplinary staffing occurred. Review of assessment results, diagnosis of clients, and recommendations comprised the staffing agenda. Non-LD clients were remanded to VRS for further assessment services. Clients diagnosed LD returned for further vocational assessment. Interpretive conferences to review evaluation results as well as recommendations were scheduled for clients regardless of the diagnosis. Though these refinements have increased the ease and quality of vocational evaluation through the LD Project, additional changes are anticipated.

The adult LD Project utilized the interdisciplinary assessment suggested for LD adults in literature. The pervasive nature of a learning disability necessitated a multidisciplinary assessment. This multidisciplinary approach provided vital information regarding social networks and psychosocial stressors as well as other vocational assets and limitations. Results may be utilized in vocational planning and transitional services to effect successful employment.

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# A WORK MEASUREMENT APPROACH TO FUNCTIONAL ASSESSMENT

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**ABSTRACT:** The work oriented human service industry has grown out of the current emphasis on projects with industry, transition programs, economic pressures on facilities to develop work oriented client programming, supported work and job placement. These developments have required evaluators to place a high priority on the relationship of assessment results to external work placement. Thus, there is need for evaluators to have techniques and skills in Work Measurement and Functional Assessment.

This paper will examine an industrial engineering approach to Work Measurement (MODAPTS) and its functional assessment component (Workability). It will present a method in which a precise approach to the following questions can be utilized.

1. What is the handicapped person's performance in relationship to employer requirements?
2. What is the degree of deficit in various work tasks?
3. What is the most efficient method of performance for the person doing the task?
4. What are task performance requirements for jobs in the workshop and/or community?
5. How does the evaluee's performance profile compare to industrial requirements?

Since 1909 (Maynard, 1971) engineers have utilized stopwatch time study and predetermined time standards to measure work. Engineers have used work measurement to determine:

1. reasonable time for a person to carry out a defined task;
2. a reasonable amount of output for the person performing the task;
3. the most efficient method of performance for the person doing the task.

A predetermined motion time standards system (PMTS) (i.e. MODAPTS, MTM, Work Factor, Standard Data) is an advanced work measurement technique whereby established standard data for basic human motions are calculated, resulting in standard time required for the performance of various operations. As an alternative to traditional stopwatch time studies, the PMTS approach reduces subjectivity in evaluating an individual's performance relative to that of a trained, experienced worker.

During the past decade rehabilitation professionals and industrial engineers have recognized the value of work measurement techniques in the assessment of handicapped individuals workplace capabilities. Shinnick and Black (1983) proposed the use of work measurement and methods engineering techniques in vocational evaluation process. In Australia the founder of MODAPTS (Modular Arrangement of Predetermined Time Standards) published Workability, (Heyde, 1974), the functional assessment system examined in this paper. In 1975 the International Methods Time Measurement (MTM) Directorate suggested that a project be undertaken to develop a system to aid the rehabilitation of handicapped and disabled people. This effort resulted in the Mast System (Wilcock, 1984). These developments strongly indicate the perceived need for the application of work measurement to evaluation.

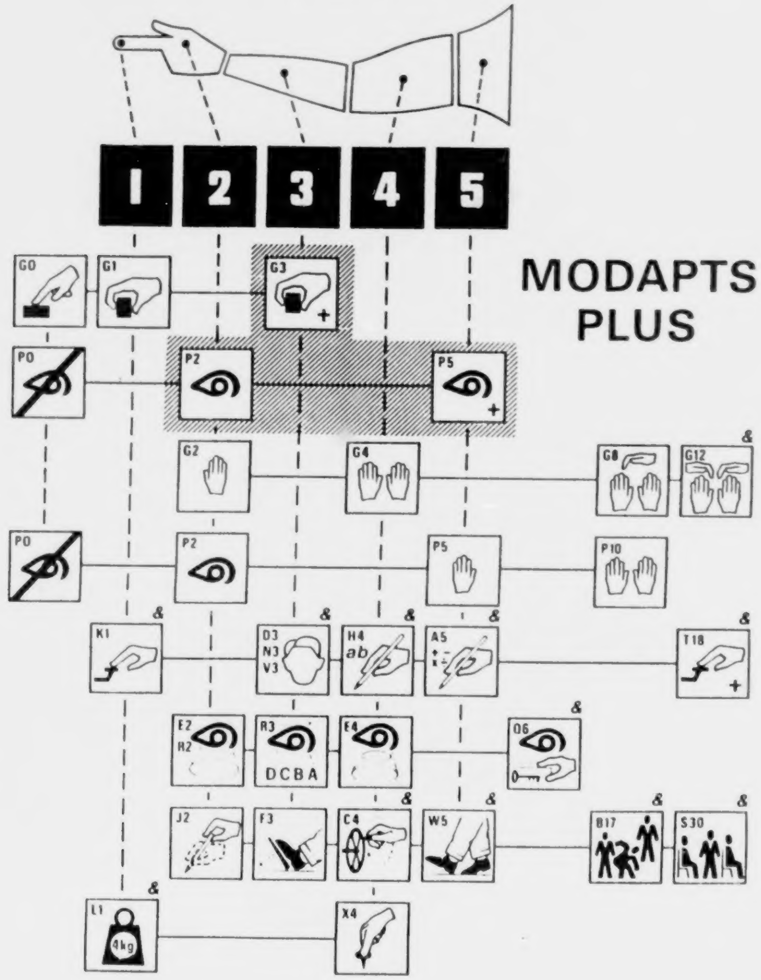
Throughout the world evaluators have accepted MODAPTS and Workability as a valid and useful PMTS and work capability assessment tool (Shervington, 1978; Yokomozo, 1980; Bootle, 1978; Brolin, 1981). For many of the same reasons industrial engineers and the world industrial and commercial communities have accepted and utilized MODAPTS. They have found the 21 motion elements in MODAPTS and the 69 motion elements for clerical and transit work in MODAPTS Plus (Heyde, 1983) to be quicker and easier to learn than the 400 elements of Methods-Time-Measurement (MTM) and the 150 elements of Master Standard Data (MSD). According to Shervington (1978):

"Most of the consumers of our work assessment services: direct (patients and clients), indirect, (doctors, lawyers, and insurance assessors), are able to understand the jargon of this workplace and body-part method of assigning values to elements that make up tasks expected of people at work."

The most obvious feature of MODAPTS is its fundamental simplicity. MODAPTS is based on the principle

Figure 1

*The MODAPTS PLUS Card



*The figure originally appeared on the cover of:
Heyde, G.C. (1983) MODAPTS PLUS. Sydney: Heyde Dynamics, Pty. Ltd.

that all body movements can be expressed in terms of multiples of a simple finger movement. The units of time adopted for use in MODAPTS are called MODS. The value of a mod is 129 milliseconds, which is also the a same as a 0.129 finger move (coded M1). A hand move becomes an M2 (2x0.129 seconds), a forearm move is an M3 (3x0.129), and a whole arm move an M4 (4x0.129). Likewise, a foot move is F3 (3x01.29), an eye use is E2 (2x0.129), and a bend and rise is B17 (17x0.129).

The elements in MODAPTS Plus (Heyde, 1983), represented by boxes with pictures of body parts, alphabetics and integers, encompass nearly all of the physical activities by which people carry out work. The MODAPTS Plus card in Figure 1 depicts rows and columns of boxes. Each column has the same integer value such that the first column has zero value, column two has a value of one, etc. Likewise, the lines across have some "family" connection. The boxes on the first line are "gets"; on the second line "puts", and on the sixth line of boxes are elements not elsewhere included, where eye use is a major factor.

Users of the system identify the body part(s) used to carry out some action or series of actions. It they are fluent in the system they recall what the elements are, write them down, add them up, multiply by the frequency, divide by 7, and give the standard time in seconds. In many cases a simple standard can be produced by a fluent individual in a few minutes.

Users who are less fluent have to look up the definitions of some of the elements, hence, writing a standard takes longer. Learning the system takes four days, two 2- 1/2 day training programs is ideal. After learning the system, another forty hours is required to develop fluency.

Workability with MODAPTS (Heyde, 1974) provides a series of comparatively simple assessment tasks that measure the functional capabilities of workers (particularly those with some known impairment) and then compares them against the standard performance of a "normal" person. The assessment battery consists of 21 work tasks that are related to the MODAPTS elements. The Workability assessment tasks can be administered in approximately two hours.

The results of Workability are reported in a profile that compares the evaluee's performance against the MODAPTS standard for that task or set of tasks. The results can be further verified through the use of simulated tasks and job trials (Shervington, 1974). Workability can be utilized to assist with the following:

1. Placement of people on tasks that maximize their strengths;
2. Training of workers in areas of identified performance deficiencies;
3. Job redesign to minimize worker deficiencies or maximize strengths;
4. Job modifications to increase worker performance;
5. Determination of performance loss due to injury through the MODAPTS analysis of tasks or jobs performed prior to impairment compared to Workability assessment post-injury.

## Assets and Current Limitations of Workability

Workability may be considered a form of functional assessment, which has been defined by Miller and Mulkey (1983) as "a systematic process of identifying and quantifying an individual's rehabilitation potential for a given occupation." Functional assessment can be distinguished from a physical capacity evaluation which has been defined by Harrand (1982) as "a systematic assessment of physical performance and performance potential by a qualified and medically educated professional." Workability measures functional skills that reflect actual components and movements of work which can relate to a specific job. By measuring specific skills required for successful industrial performance, Workability provides functional information that can be generalized to many work areas, but particularly production oriented work. This can allow the identification of functional skills that need improvement or possible job modification.

Workability has many assets which favor its usage as an evaluation tool. Workability can provide a quick (2 hour), inexpensive (under $500) and easily learned system for the initial screening or measurement of the degree of progress of clients, particularly those clients with physical disabilities. Due to the short testing time, Workability would work well as an assessment of learned skills or physical improvement of a client while in a rehabilitation center or work center.

A primary advantage of Workability has been the assessment of functional skills that reflect actual components and movements of work. By evolving from an original work measurement system (MODAPTS), Workability assures that it is directly related to skills that are involved with work.

Workability also has the potential to establish a cooperative and productive relationship between production and evaluation. By being based on a work measurement system, and measuring motions of work, there is greater face validity for production staff (particularly compared with psychometric testing). This can encourage the involvement of production staff in the evaluation process and provide a common language for information exchange between evaluation and production. This can also encourage the evaluator to develop a greater awareness of production standards and work skills.

A unique aspect of Workability involves the measurement of physiological effects (pulse) of heavy work activity and the concept of work capability. Physiological measurement can provide an estimate of energy expenditure which may be required for heavy work and suggest possible job restrictions or medical follow-up. An additional concept which is unique to Workability has been termed capability. This compares an individual's performance on an unskilled activity with the performance of a normal worker. Since the activity is unskilled, the individuals performance can be assumed to measure his/her physical capability and the resulting percentage will reflect that person's capability to do the task provided the individual is motivated.

Workability concentrates primarily on the screening of dexterity related, repetitious tasks, it also includes components such as motivation, clerical skills and reading which are related to a broader range of jobs. The tests of reading, math and writing are limited in scope, but can serve as screening tests until more diagnostic tests are administered. As a screening device, it serves to complement the more thorough evaluation tools such as work samples, situational assessments and job tryouts.

The Workability system could be improved by modifying the manual. Currently, the instructions and interpretations of results are not explicit and leave considerable room for evaluator speculation. This is particularly evidenced by the norms which provide only the "expected time" for completion of the task. With fluency in MODAPTS, the percentage of normal time can be determined for norms, but this could be supplied in tables for the evaluator's convenience. The use of terminology such as "good" time on some tests increases this difficulty in interpretation.

Workability primarily emphasizes speed of work and not quality. Quality of work and scoring of errors are discussed on several tests, but this reasoning is vague and for most tests it is an "all or none" proposition for quality scoring. Quality and speed scoring are also combined such as in the math test in which 5% is added to the time score for each incorrect digit. This again decreases the emphasis on quality by not separating the two scores.

The shortness of many of the tests also leads to some questions concerning reliability. Of particular concern are the tests which may involve considerable learning after one administrator. This is demonstrated in Test 18 in which the client is timed on looking up one telephone number. Retesting may be significantly influenced by the previous administration, but the manual does not mention any concern and interpretation is again difficult.

A revised manual that provides more explicit instructions, norm tables, scoring sheets and performance quality guidelines will be available through Auburn University in Winter, 1985. The manual will be a companion piece to a portable Workability Kit that will include all of the equipment required for the 22 tests.

## Utilization of Workability in Service Delivery

Predetermined time standards used in assessing individual capabilities offer the vocational rehabilitation specialist quantitative and objective information to serve as benchmarks in comparing client performance and job task requirements. The 22 tests within Workability provide data which assists in identifying the ability range of the client. This performance data can provide valuable input to the rehabilitation team in improving specific functions, redesigning tasks for the individual and comparing the individual's functional movement capabilities with the analysis of available employment opportunities.

Applications of Workability in Australia have demonstrated that the information gained from these workplace capability tests is enhanced when used in conjunction with other methods of assessment. Specifically, situational assessment, work simulation and community work trials have been found to effectively complement the Workability tests (Shervington, 1978). Because the elements measured in the assessment tasks can be readily compared to the different activities of piecework or other repetitive tasks, production impediments can often appear clearer resulting in more likely remediation. For example, a client capable of achieving 75% of standard time in a Workability test measuring certain manual movements may be performing tasks in a facility work center utilizing the same movement patterns, yet only achieving 50% in actual production. Program staff and production personnel, after reviewing the client's Workability profile, may be better prepared to advise the client toward maximizing this 75% capacity. Individuals may likewise be assigned to work tasks which emphasize programmatic gain and accelerate production output thereby alleviating a source of internal conflict common to many production oriented rehabilitation programs. Implicit in the Workability assessment approach is this positive focus on worker strengths. Increase in wages resulting from individual productivity gains subsequently reinforce work motivation for the great majority of clients.

Another notable advantage to staff performance lies in the development of a basic orientation to industrial engineering concepts through an understanding of Workability and MODAPTS. Counselors and other adjustment personnel quickly demonstrate greater familiarity with underlying principles of tasks analysis, job analysis and vocational exploration activities.

Benefits derived from the adoption of MODAPTS techniques in concert with Workability assessments are perhaps most obviously relevant to the concerns of work supervisors and production managers. The MODAPTS system, upon which Workability is founded, allows for more accurate (Riesel & Roll, 1977) and less time consuming establishment of work standards in contrast to traditional stopwatch time study methods. Research conducted by Price Waterhouse in industrial situations demonstrated that standards for normal work operations can be produced at the rate of 20 or more daily (Colbert, 1970). Computeriazation of standard setting through MODAPTS further expendits the process through availability of "user friendly" software for IBM, Apple and Radio Shack microcomputers. One exceptional software feature is a program that yields rest and recovery allowance information for work tasks. This eliminates subjective allowance factors or across-the-board ratings which do not consider other fatiguing conditions that may be inherent to the task. The process thereby lends a more accurate estimate of direct labor costs and the establishment of fair wage rates.

Awareness of the time values associated with each element fosters sound thinking in work layout practices as well as the design of jigs and fixtures to minimize difficulty of task and energy expenditure. By analyzing the overall profile of facility caseload capabilities, production staff can more effectively focus on specific sub-contracting and prime manufacturing endeavors. In general terms, the techniques and philosophy of the MODAPTS/-Workability approach to rehabilitation production management can serve to maximize overall work center productivity levels on existing tasks and expand production capacities for new tasks.

Finally, in consideration of the potential enhancement of rehabilitation service, attention is directed toward a growing Federal-State priority for job placement. The objective verification of job readiness through proven performance in like tasks increases the client's prognosis for a successful outcome when placed in community employment.

Hence, the MODAPTS/Workability approach to work measurement can provide assistance to a spectrum of facility personnel including evaluators, adjustment staff, production personnel and placement specialists. Perhaps the most salient contribution to be derived from our profession's potential evolution toward this advanced system of analyzing work will be the development of a common language among different roles in vocational service delivery (Shinnick, 1985). The reader should note that Workability is not only a system for the rehabilitation of clients with physical disabilities, albeit the possibilities for new horizons in this area are promising, it is also an approach to planning, measuring and describing work which affords a new dimension in functional assessment of work capabilities regardless of disability.

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# FURTHER DEVELOPMENT OF THE VOCATIONAL DECISION-MAKING INTERVIEW FOR HANDICAPPED POPULATIONS

**THOMAS CZERLINSKY**

**ABSTRACT:** The research investigation considers the complex issues facing clients and students when making vocational decisions. Using an instrument developed earlier by the Research and Training Center at the University of Wisconsin-Stout, the vocational Decision-Making Interview (DMI), this investigation sought to examine the effect that vocational evaluation may have in changing vocational decision-making capacities and to determine the stability of the DMI scores over a time period of one week.

Many clients receiving vocational rehabilitation services must make some major decisions concerning their vocational future. Like nonhandicapped individuals, such clients vary greatly in their ability to make vocational choices and decisions. They can range from those who have made a vocational decision and are actively pursuing that choice, on the one hand, to those who lack the skills required to go about acquiring information, making a vocational decision, and/or implementing that decision. This end of the continuum may display the "indecisive personality" (Holland and Holland, 1977). In addition, however, compared to non-handicapped individuals, clients may have somewhat more difficulty in making such decisions, because of the limitations imposed upon them by their disability, and because of the limited period of time that they receive rehabilitation services.

The issues involved in vocational decision-making, and the problems surrounding these issues, have been widely studied, and cover a broad spectrum. An extensive review of these issues can be found in a number of sources (e.g., Czerlinsky et.al, 1982). An important point needs to be made concerning these studies, however. And that point is, while vocational decision-making and vocational indecision is relevant to all individuals (including rehabilitation clients), most of the research addressing these areas has considered only high school and college populations (Fugua and Hartmen, 1983; Hartman, Fugua, and Hartman, 1983; Taylor and Betz, 1983; and Thorensen and Ewart, 1979). Rehabilitation clients have been studied very little in this regard. In fact, there is little literature available dealing with the vocational choice problems of special populations in general (Phillips, Strohmer, Berthaume, and O'Leary, 1983). Considerable work has been done in the area of vocational choices, yet only a few articles (e.g., McCarthy, 1983; Holder, Friel, and Tyler, 1979; and Rosenberg, 1979) have dealt specifically with special populations served by rehabilitation. Phillips, et.al. points out, in addition, that despite some increase in studies dealing with special populations since 1975, caution must be used in interpreting some of these studies, since they may be based upon insufficiently founded assumptions and/or weak and inadequate research. Thus, little is in actuality known about the vocational decision-making problems of these special populations, or about possible remediation or treatment strategies directed toward these problems.

There is a definite need in vocational rehabilitation and special education to consider the complexities which clients and students face in making vocational decisions. Such individuals receive a variety of services which deal specifically with this area, yet there is no real adequate means for effectively assessing these special populations in this realm. For example, one service that is directed toward the area is Vocational Evaluation, a service that is concerned with systematically gathering client information for planning and prediction purposes in the vocational realm. In addition, Vocational Evaluation ideally should use the information collected to determine what problems the individual may have in making vocational decisions, and to assist the person to make these decisions. To be an optimally effective service, Vocational Evaluation should enable the client to be an active participant in his/her rehabilitation, not an observer to a process in which he/she is involved. To do this, however, requires considerably more than collecting vocational aptitude data. It requires exploring with the client or the student exactly what the strengths or weaknesses in making vocational decisions are, so that action can be taken to remediate any weaknesses which may be present. Although Vocational Evaluation has been singled out her these comments apply to a number of other services as well.

A basic need in this area is to develop a means by which service providers can effectively and efficiently pinpoint such areas. The development and use of an accurate tool for assessing rehabilitation client and special education student vocational decision-making strengths and weaknesses would enable service providers to pinpoint specific problem areas, and to develop strategies for the remediation of these difficulties.

In a line of prior research conducted at this Center, such an instrument was developed, and reliability and validity tests were conducted. The instrument -- the Vocational Decision-Making Interview (DMI) -- is an eighty-item structured interview addressing the very real day-to-day problems faced by handicapped individuals in making vocational decisions. The DMI items fall into three broad sub-scales Employment Readiness, Self-Appraisal, and Decision-Making Readiness. The DMI is designed to be individually administered and read to a client. The client then responds whether, for him/her, the item is true, whether it is false, or whether the client is not sure. Sample DMI items are appended. Preliminary results with the DMI were encouraging, and are fully detailed by Czerlinsky, et.al., 1982; and Strohmer, et.al., 1984. Simply put, the initial version of the DMI showed very encouraging reliability and discriminant validity data. Indicators of internal consistency of the scales showed that the three subscales indeed were adequately internally consistent. The validity criterion was that the three scales be able to discriminate between two groups of clients chosen *a priori* to differ in level of vocational decision-making capacity. This criterion was met, in that clients entering Vocational Evaluation scored significantly lower than clients in vocational training. One caution with this between-groups design was that, since the subjects were different between the two experimental groups, factors other than those hypothesized (for example, selection factors that may influence which clients enter vocational training) may have had an influence upon the differences found between the evaluation clients and the training clients. The research presented below will address this, since the data is gathered in a pre-post test design. Readers interested in a closer inspection of the data gathered in the initial study should refer to the previously mentioned publications.

In a current series of four research projects, the reliability, validity, and utility of the DMI is being further investigated. This series of studies is being conducted with vocational rehabilitation clients at Stout Vocational Rehabilitation Institute's Vocational Development Center, and at several Special Education sites in three different states. Studies are investigating: 1) the stability of DMI scores over varying intervals of time (and, in one study, with and intervening treatment directed at changing vocational decision-making capacity); 2) the concurrent validity of the DMI with independent ratings of the clients by professional evaluators working with the clients; and 3) the demographic characteristics of clients and students who may be particular types of vocational decision-making problems. The results presented in this paper are the first to come out of this series of studies.

## Methodology

As described above, the data presented in this report stems from a number of ongoing studies. The primary study utilized here was concerned with testing vocational rehabilitation clients with the DMI as they entered the Vocational Development Center for evaluation. The same clients were then retested at the end of the same week (evaluations at the VDC are of a one week duration). In addition, extensive demographic data was gathered on each client at the beginning of the evaluation.

Some of the purposes of this project were: 1) to investigate the effect that an active treatment (Vocational Evaluation) may have in changing vocational decision-making capacities, as indicated by changes on DMI scores; and 2) to determine the stability of DMI scores over a week's interval.

### Subjects

The primary group of subjects yielding the data for the present report were eighty-six vocational rehabilitation clients receiving Vocational Evaluation services at the Vocational Development Center, the service component of the Stout Vocational Rehabilitation Institute. The subjects were randomly sampled from the population of clients receiving these services. The only deviation from the random sampling was that scheduling constraints ruled out a small number of potential subjects from participation. The majority (84) of the subjects were referred for Vocational Evaluation by the Division of Vocational Rehabilitation. For 67 of the subjects, the primary source of income was from their own families. Demographically, they were primarily caucasian (81) males (53). The average age was 28, with a range extending from 16 to 59. The most frequently indicated primary disabilities were as follows: Orthopedic, Musculo-Skeletal, MS, MD, Stroke (34); Learning Disability, Developmentally Delayed (18); and Alcoholism (10). Regardless of the primary disability, twenty-two percent of the clients (19) were industrially injured.

In presenting the results, reference will also be made to Special Education students. These were recruited for some of the studies at two sites. One was 916 Vo-Tec at White Bear Lake, Minnesota. The other was the W.A.T.C.H. (Work Adjustment and Training Center for Handicapped) program of

Cincinnati, Ohio. Both of these facilities serve large numbers of handicapped youth referred primarily by the public school systems. These subjects were also randomly selected for participation in one of three studies. This sample is ancillary to the present report, and full reports utilizing their data are forthcoming.

### Instruments

The vocational Decision-Making Interview (DMI) is the primary instrument of concern in these studies, as it is the instrument being developed and validated. It has been summarily described above. Only a short description will be given here, and the reader is referred to the two previous publications mentioned above (Czerlinsky et. al., 1982; Strohmer et. al, 1984). Basically, the DMI is a structured interview format comprised of eighty questions. It taps three general topic areas, which have been labeled Self-Appraisal, Employment-Readiness, and Decision-Making-Readiness. Each of these topic areas is in turn comprised by sub-categories directed toward the actual problems faced by handicapped individuals. The eighty items of the DMI are read to the client, and the client answers whether the item is true for him/her, whether the item is false, or whether he/she is not sure. Being an interview, rather than a test, interpretation and elaboration by the tester (within specified limits) is permitted and, with certain types of clients, encouraged. Each of the items is scored on a three point scale (True, Not Sure, or False). In addition, about half of the items are followed by open-ended stems, for which the client indicates actual choices corresponding to the items. Depending upon the particular characteristics of clients being interviewed, total DMI administration takes from twenty minutes to fifty minutes. The average administration time is about a half-hour.

### Procedures

At the Vocational Development Center, Vocational Evaluations are typically of a one-week duration, beginning on Monday and ending on Friday. At the beginning of each evaluation week, the manager of the evaluation services compiled a list of clients who were to receive Vocational Evaluation, and who could be considered as potential subjects. The experimenter then approached each potential subject to inquire whether he/she would be interested in participating in the study. The procedures of the study were fully explained to all potential subjects, and any questions which they had were answered. Clients were totally free to decline to participate.

Subjects who agreed to participate were scheduled for their first interview on Monday or Tuesday of the week. At this interview, the informed consent form was read to them. After subjects signed this form, extensive demographic data was collected in a structured interview. Then the DMI was administered. It was read to each subject individually, in a testing room which was quiet and private. If a subject did not understand an item, the experimenter would elaborate and explain the item before proceeding to the next item. At the completion of the DMI, subjects were scheduled for their second interview later in the week. Scheduling was conducted so that all subjects would have a four day pre- to post-evaluation interval (e.g., subjects interviewed on Monday would be re-interviewed on Thursday, while those interviewed on Tuesday would be re-interviewed on Friday).

At the second interview, the post-evaluation DMI was administered, in the same manner as the pre-evaluation DMI. After completion, subjects returned to their evaluator to complete the Vocational Evaluation process. All subjects who completed the study were paid $5.00 for participation.

In the "Results" section below, reference will be made to some comparisons of means based upon students. The students were subjects in a different study, which was carried out in Special Education settings (mentioned previously). These students also received Vocational Evaluation at their respective settings, but only one DMI was administered, and this DMI corresponds to the pre-evaluation DMI in the VDC client study.

## Results

The results are presented in several sections. The primary results for purposes of this paper concern the relationship between the pre-evaluation DMI scores and the post evaluation DMI scores. Table 1 presents the pre-post rank-order correlations for the three DMI subscales as well as for the DMI total score. Rank-order correlations were utilized so that relative stability could be determined in a situation in which an active treatment intervened between the two measurements. As can be seen from this Table, there is a significant positive correlation for Employment Readiness (r=.61), for Self-Appraisal (r=.73), and for Decision-Making Readiness (r=.71) when correlating pre with post scores. DMI Total score pre-evaluation also correlated quite highly (r=.78) with the corresponding Total score at the end of evaluation. Each of these correlations was well past the .01 level of significance. These correlations indicate that overall, DMI scores at the beginning of the Vocational Evaluation are quite satisfactory predictors of DMI scores at the end of Vocational Evaluation. Or at least (regardless of the evaluation that was conducted), that DMI scores at one point in time are relatively stable at a point four days later. An important point to keep in mind is the word "relatively," since this will play an important part in the interpretation of the next set of data, and will be discussed later.

Table 1

Pre-Post Evaluation Rank-Order Correlations
for the Vocational Decision-Making Interview

| | Pre-Post Corr | p |
|---|---|---|
| Employment Readiness | .61 | <.01 |
| Self Appraisal | .73 | <.01 |
| Decision Making Readiness | .71 | <.01 |
| DMI Total | .78 | <.01 |

The next set of analyses was concerned with whether the active intervention of Vocational Evaluation appeared to have an effect on the clients in this study, in terms of their scores on the subscales and total on the DMI. That is, all clients participated in four days of Vocational Evaluation between the pre-test and the post-test. Presumably Vocational Evaluation addresses issues such as those tapped by the DMI, and thus, if the Evaluation is effective in such a short period of time on these dimensions, an effect of the Evaluation may be detectable by looking at differences between the pre-Evaluation and the post-Evaluation DMI scores. The means for the sample of clients on the pre and the post test are shown in Table 2. Again, this Table is broken down into the three DMI subscales as well as a total score. The Table shows the pre-Evaluation

Table 2

Pre-Post Evaluation Means
for the Vocational Decision-Making Interview

| | MEANS | | | |
|---|---|---|---|---|
| | Pre | Post | t | p |
| Employment Readiness | 11.37 | 13.56 | 7.83 | <.01 |
| Self Appraisal | 15.92 | 18.54 | 7.40 | <.01 |
| Decision Making Readiness | 16.69 | 19.85 | 8.94 | <.01 |
| DMI Total | 43.98 | 51.94 | 11.09 | <.01 |

means, the post-evaluation means, and the results of tests for any differences between these means. Inspection of this Table shows a very clear pattern over the course of the Evaluation. Every subscale of the DMI (and thus also the total score) showed an increase over the four day period in which the clients received their Vocational Evaluation. The mean for Employment Readiness showed an increment from 11.37 at pre-Evaluation to 13.56 after the process. The Self-Appraisal scores went from a 15.92 pre-score to 18.54 after the Evaluation. And Decision-Making readiness changed from a pre-Evaluation mean of 16.69 to 19.85 after the Evaluation. The score of the DMI total score therefore increased also, going from 43.98 to 51.94. Table 2 also shows the significance of all of the differences between the means, utilizing a correlated *t*-test. This pattern of change from the beginning of Evaluation to the end of Evaluation is also shown in the histograms appended to this paper, labelled Fig. 1.

The above two sets of data will be fully addressed in the discussion. At this point, however, it should be made clear that two different patterns have been delineated in the pre- and post-Evaluation DMI scores. First, the scores remained relatively stable over the course of the Evaluation, as were indicated by the significant rank-order correlations. Secondly, scores changed significantly over the course of the Evaluation, being higher at the end of the Evaluation than at the beginning. What this pattern indicates is the DMI scores were stable in a relative sense, with clients roughly maintaining their relative ranking within the group of subjects from beginning to end of the Evaluation. That is, clients who had relatively fewer problems in making vocational decisions (as judged by the DMI) at the beginning of evaluation still, in a relative sense, had fewer problems than the other clients at the end of the Evaluation. Imbedded within this pattern, however, is a significant effect of the active Evaluation treatment. Without question, the clients in this study scored better on the DMI at the end of the Evaluation than they did at the beginning. Another way of saying this is that the Evaluation appeared to have a positive effect on the majority of the clients.

One last pattern of means will also be mentioned. As pointed out earlier, DMI data, in a somewhat different design, was also collected at two Special Education sites (White Bear Lake, Minnesota, and Cincinnati, Ohio). The overall results of these studies are currently being analyzed. However, Figure 2 shows a comparison of DMI subscore means for both the Special Education and VDC client populations. It can be seen that the Special Education Students are somewhat lower than the clients on all three of the DMI scales. Note that the client means are based upon the pre-Evaluation DMI's, before any influence of the process of Evaluation would have increased the scores. Age and life experience may be showing their influence in these differences.

## Discussion

The data that has been presented above represents several in a series of studies concerned with further reliability, validity, and utility testing of the Vocational Decisions Making Interview (DMI). The development of the DMI has been carried out in a series of successive research projects, with the current projects marking the end of the developmental phase. The results that were obtained before the initiation of the current project have been described at the beginning of this report. References have been given for any readers who would like to become more familiar with the basic structure of the instrument, or with specifics of the prior research. In this earlier research, the DMI was developed, tested, and revised. Reliability and validity indicators were promising for an initial version of a new instrument.

The current series of projects is comprised of a number of studies conducted at rehabilitation and special education sites, and subjects are recruited from both vocational rehabilitation and special education populations. The research designs of these studies have already been detailed. The data of the present report comes primarily from a rehabilitation client study in which clients were interviewed with the DMI as they began Vocational Evaluation and again as they completed the evaluation. The primary purposes of this design were 1) to evaluate the stability of DMI scores over an interval of time, while 2) determining whether an active treatment (Vocational Evaluation) would have a discernible effect on DMI scores.

The results showed a number of clear patterns. First, the rank-order correlations between pre-evaluation DMI scores and post-evaluation DMI scores were positive and significant. Secondly, on all of the DMI subscales as well as on total score, the post-evaluation means were significantly elevated over the pre-evaluation level. This was an interesting pattern of results. The differences between the pre- and post- means indicates that during the course of the Vocational Evaluation, clients significantly improved in their scores on the DMI. However, the correlations between pre- and post- suggest that while clients improved on the DMI during the study, their relative scores were fairly stable. This suggests that, during the evaluation, a positive influence appears to have been exerted on a large number of clients. Thus, the best predictor of post-evaluation scores appears to be a combination of pre-evaluation score and average change during the process of Vocational Evaluation. This is a positive statement both for the DMI and for the process of Vocational Evaluation. From looking at these results, one can conclude that 1) DMI scores exhibit relative (to one group) stability over a period of four days, and 2) the process of Vocational Evaluation seems to exert a positive influence on vocational decision-making capacity (as measured by the DMI).

One criticism that can be directed against a research design of this nature is that the post- test may have been influenced by the pre-test, since it is the same instrument administered only four days apart. However, this criticism seems rather unlikely, since, in the previous study mentioned earlier (Czerlinsky, et.al., 1982), a between-subjects design (which used a group of vocationally undecided and a group of vocationally decided clients as subjects) found a comparable difference between the means. Conversely, in the previous between-subjects design, a potential criticism was that the vocationally decided clients (clients receiving vocational training) may have been higher on the DMI simply because of selection factor that prevented the less vocationally decided clients from entering vocational training. The present results, utilizing a within-subjects design, makes this second criticism also appear less likely. When the same pattern is found utilizing both a between- and a within- subjects design, the results become more convincing. An additional comparison is currently being conducted, but the data is not yet completely collected. This is a test-retest design with no intervention, which will be utilized as a comparison no-treatment control group. If the above interpretation is correct, then this test-retest study will show significant correlations between the two DMI administrations (as the present results) but no significant difference between the two administrations.

The last comparison presented in this report was shown on Figure 2. This concerns the means on DMI scores of clients and of students. This figure was not a statistical comparison, but rather was presented as a point of interest. In general, the special education students scored fairly close to the means of rehabilitation clients, but they were consistently somewhat lower. This may be an indication that the special education students, when compared to the rehabilitation clients, were somewhat less job ready, or have had less life experiences. In general, it may be indicative simply of less maturity.

The results presented in this report are a further step in the development of the DMI. When evaluating these and previous data, it is important to keep in mind that the instrument is still evolving and changing, and that further refinements will undoubtedly still take place. Several points, however, need to be addressed concerning the data presented. First, as was mentioned above, the present design (within-subjects test-retest-design) has certain limitations as well as strong points. But when combined with the previous between-subjects design, the overall results of each one support the other, and the data from both series of studies are consistent with each other and help rule out experimental artifacts.

A second point to be addressed concerns the nature of the treatment intervention in this study. The data has suggested that Vocational Evaluation has an effect on elevating scores on the DMI. The evaluation is an active treatment, and Vocational Evaluation is directed toward the realm that is measured by the DMI. But the results do not indicate specifically which aspects of Vocational Evaluation may be most related to this change. Something within the process of Vocational Evaluation appears to be effective, but what the specific aspects are which contribute to this effect is open to speculation and to further research. As the DMI becomes more refined as a result of additional research and utilization within the field, it is hoped that such questions can be addressed and answered, since answers to such questions could be very beneficial to the fields of Vocational Rehabilitation and Special Education.

The ultimate criterion for an instrument, such as the DMI, once its reliability and validity have been established, is concerned with its utility. It must provide something useful to the field. It is expected that the DMI will impact at a number of different levels.

First, it should be of benefit to handicapped individuals themselves. It can provide feedback which should be helpful for such individuals in defining their own areas of strength and weaknesses in terms of vocational decisionmaking. It can be utilized in a manner that enables such individuals to become more actively involved in the process of making their own vocational decisions. This should be quite important while they are receiving a service such as Vocational Evaluation. An important point in the regard is that the DMI will not be restricted to a very narrowly defined population. It should be useful not only for rehabilitation clients, but also for a range of other special handicapped populations. Its mode of administration (a verbally administered structured interview with allowance for clarification and interpretation) contributes to making it useful to a variety of populations. It may be found that the DMI is more suitable for some types of persons (on a basis of disability, age, etc.) than for others, but this will remain to be seen as the instrument begins to be utilized and evaluated in the field with a variety of populations in a variety of settings.

Secondly, the DMI should be very helpful to service providers (such as counselors and vocational evaluatorss) concerned with vocational decision-making of their clients or students. It is designed to provide information which can be used by these professionals in providing the appropriate services. It should provide an efficient means of gathering this information, since the data can be collected rather quickly and efficiently, and it can be collected early in the treatment process, which means that treatments can be individualized right at the beginning of the treatment.

Thirdly, the instrument can be used to help improve services. It can point out areas of vocational decision-making which may not effectively (or at all) be addressed by a treatment, and greater emphasis can be placed upon aspects which the *DMI* shows to be in need of such. In addition, by providing information about a person's vocational decision-making strengths and deficits *out front* at the beginning of a treatment such as Vocational Evaluation, the program/ service can be individualized and tailored to the specific needs of the particular individual it is intended to serve.

Lastly, the *DMI* has the potential to be very useful in designing new programs directed toward alleviating vocational indecision. For example, it has been used by a public school system as one input for developing a new curriculum for handicapped high school students to help them plan for their vocational future. The *DMI* data provided indicators, in this case, which were used for determining the areas which the new curriculum is addressing.

All in all, as the above indicates, the *DMI* should have a broad spectrum of utility, ranging from the handicapped individual, on the one hand, to the development of new programs, on the other hand.

## APPENDIX A

Figures 1 & 2

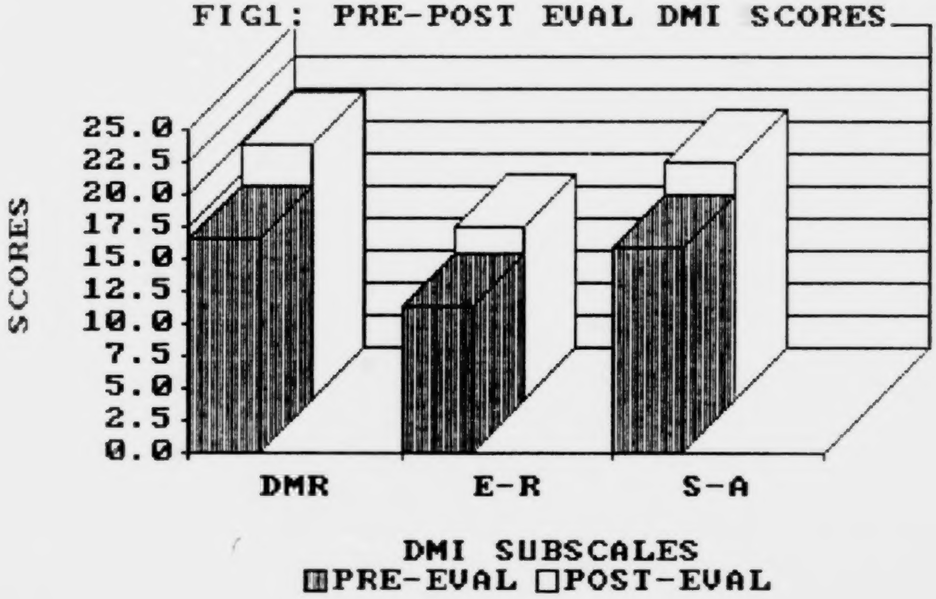
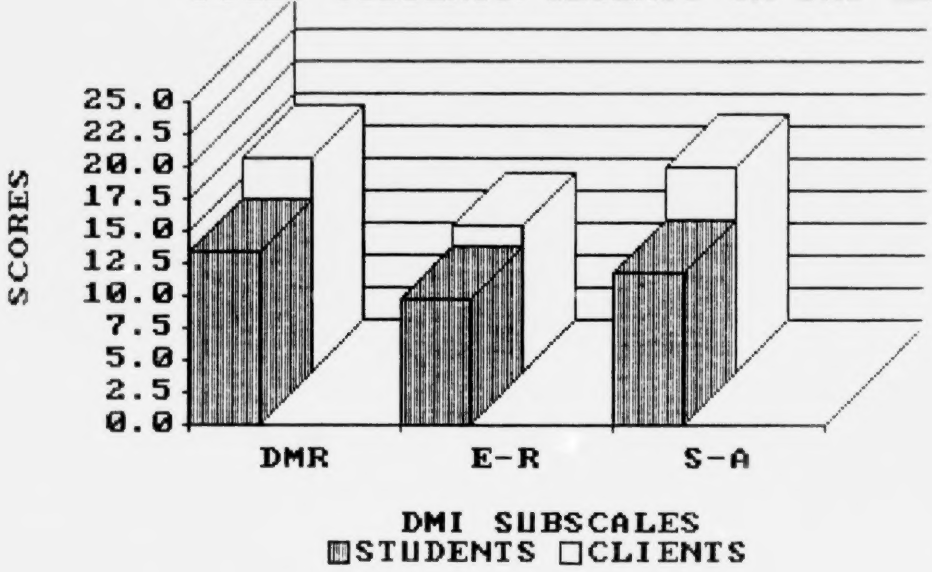


FIG2: STUDENTS/CLIENTS ON DMI



## APPENDIX B

### Sample DMI Items

**DMI Employment Readiness Scale -- Sample Items**

I have few job choices, because it is hard for me to get around.
I would take a job that my family and/or friends didn't approve of.

**DMI Self Appraisal Scale -- Sample Items**

I feel sure of myself when I have to make a decision about a job.

I have let others decide which job was best for me.

**DMI Decision Making Readiness Scale -- Sample Items**

I would be good at choosing a job on my own.

If I know what a job is like, I can decide if I could do the work.

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# A COMPARATIVE STUDY OF PERFORMANCE SCORES ON THE VALPAR COMPONENT WORK SAMPLES

**PIERRE DION**

**ABSTRACT:** This study focused on an analysis of performance scores on the Valpar Component Work Samples (VCWS) numbers 1, 4, 5, 6, 8, 9 and 11 of local handicapped individuals compared with normative data obtained from Valpar using their standards of two populations, the Skill Center and San Diego Employed Worker norms. Results identified a general trend in which the vocationally handicapped individuals performed significantly slower on time parameters and where applicable, accuracy measurement than the competitive group norms. These results have relevance to the motivation, aspirations and degree of disability limitations of clients to enter those skill occupations as assessed by the VCWS.

Competitive work sample norms offer the opportunity to describe the level of performance attained by vocationally handicapped individuals. As a reference group, competitive norms introduce a measure of employability used as a basis for comparing clients and competitive norm groups, comparing a client's level of performance with industrial and/or training school norms has elected a controversial debate (Allan & Sax, 1972; Gibertson, 1973; Hansen & Menz, 1979; McCray, 1979, 1980; Parker & Hansen, 1976). Berven & Maki (1982) indicated that:

> Use of client norms may overestimate potential for competitive employment, where the performance of the client is well below that of employed workers .... On the other hand, use of industrial norms may underestimate potential due to client inexperience as an industrial worker, or to disability and associated functional limitations, or both. (p.22).

Thus, client norms are potentially more lenient toward satisfactory performance requirements. Consequently, competitive norms with restrict satisfactoriness of performance for even those clients that performed well when compared to other clients.

The concern that competitive norms could be prejudicial to clients was also discussed in a Research and Training Center conference on critical issues in vocational evaluation (Dunn, Korn, & Andrew, 1976) where attention was drawn to the fact that the full percentile range of industrial norms are considered acceptable to the labor market. Thus, even the first percentile of these norms are deemed satisfactory. Eventually, the debate of using clients vs. competitive norms was resolved by the adoption of a work sample standard developed by the Vocational Evaluation and Work Adjustment Association (VEWAA) and the Commission on Accreditation of Rehabilitation Facilities (CARF) which declared that "Competitive norms or industrial standards shall be established and used" (CARF, 1978, p. 28).

Alternatively, maintaining and updating client norms can be used to assess strengths and weaknesses of the population served. For descriptive purposes, comparing sets of norms from subgroups of clients enables practitioners to clarify functional characteristics related to the population's demographic variables. In addition, such norms provide baseline data for measuring the extent to which client norms differ from competitive norms. If it is expected that client norms overestimate potential for competitive employment, then measuring this overestimation would have relevant impact to program evaluation.

The purpose of this study was to compare the performance of vocationally handicapped individuals on selected Valpar Component Work Sample with normative data obtained from the Valpar manufacturers on the San Diego Employed Worker Group and the Skill Center Low Income unemployed group. The intention of the comparison was to verify and examine the assumption that client norms are different than competitive norms.

## Method

### Subjects

Baseline data were obtained from 400 disabled clients undertaking a vocational assessment program at the Resource Development Center (RDC) in Calgary, Alberta, Canada. Depending on the Valpar Component Work Sample (VCWS) administered sample size ranged from 38 to 397 clients with varying proportions between demographic variables.

The majority of clients were of Caucasian descent (approximately 90%) with mean age of 26.7, education level of 10 years and men/women ratio of 2:1. Clients' disabilities were grouped into four categories. In category one, clients were diagnosed as emotionally/psychiatrically disabled. A second category comprised those clients experiencing some type of learning disability in school systems. A third category included those clients medically diagnosed as having a physical dysfunction. A fourth category (miscellaneous) was given to those clients who did not easily fit the above disability grouping but experienced difficulties procuring or staying with employment.

Table 1

RDC Population Description for Each of the Valpar Work Samples

Percentage (%)

|  | Sample | Mean | Sex |  | Disability ** |  |  |  |
|---|---|---|---|---|---|---|---|---|
| VCWS * | Size | Age | Men | Women | ED | LD | PH | NS |
| 1-Small Tools | 38 | 23.3 | 94.7 | 5.3 | 34.2 | 31.6 | 2.6 | 31.6 |
| 4-UERM | 346 | 25.7 | 76.1 | 32.9 | 39.3 | 24.3 | 12.4 | 24.0 |
| 5-CCA |  |  |  |  |  |  |  |  |
| Tel. | 64 | 27.4 | 38.9 | 61.1 | 43.7 | 17.2 | 14.1 | 25.0 |
| MS | 65 | 27.3 | 33.8 | 66.2 | 43.1 | 18.5 | 13.8 | 24.6 |
| Fil | 62 | 27.6 | 30.6 | 69.4 | 45.2 | 19.4 | 12.8 | 22.6 |
| BK | 55 | 28.6 | 37.0 | 63.0 | 40.7 | 20.4 | 11.1 | 27.8 |
| typ | 35 | 27.2 | 14.3 | 85.7 | 48.6 | 20.0 | 14.3 | 17.1 |
| 6-Problem Solving | 131 | 24.6 | 57.8 | 42.2 | 32.8 | 32.1 | 10.7 | 24.4 |
| 8-Simulated Assembly | 238 | 25.9 | 67.2 | 32.8 | 36.2 | 30.7 | 11.3 | 21.8 |
| 9-WBRM | 361 | 26.1 | 65.4 | 34.6 | 39.6 | 28.5 | 10.0 | 21.9 |
| 11-EHFC | 397 | 26.1 | 65.7 | 34.3 | 40.6 | 25.2 | 11.0 | 23.2 |

Note: *VCWS UERM - Upper Extremity Range of Motion; CCA - Clerical Comprehension and Aptitude (Tel - Telephone Answering; MS - Mail Sorting; Fil - Filing Letters; BK - Bookkeep Typ - Typing); WBRM - Whole Body Range of Motion; EHFC - Eye/Hand/Foot Coordination.

**Disability ED - Emotional; LD - Learning; PH - Physical; NS - Non-Specific

Agency files reported that 21% of the 400 clients were known to have obtained gainful employment upon completion of the program. The demographic profile of these subsequently employed clients resembled the total sample population.

## Instrumentation

The Valpar Component Work Samples were administered following the directions and procedures outlined in the Valpar Manual.

Seven components of the Valpar Work samples were used in this study and administered to selected groups of clients based on their interests and aptitudes.

VCWS #1 - Small tools (mechanical). Performance is scored on speed and accuracy.

VCWS #4 - Upper Extremity Range of Motions. Performance is scored on speed.

VCWS #5 - Clerical Comprehension and Aptitudes. Performance is scored on speed and accuracy.

VCWS #6 - Independent Problem Solving. Performance is scored on speed and accuracy.

VCWS #8 - Simulated Assembly. Performance is scored on the number of assemblies completed during the time interval.

VCWS #9 - Whole Body Range of Motions. Performance is scored on speed.

VCWS #11 - Eye Hand Foot Coordination. Performance is scored on speed and accuracy.

## Results

T-test analysis indicated significant differences in the comparison of mean time and accuracy scores between the RDC clients and the San Diego Employed Worker and the Skill Center low income group on most of the Valpar Components.

Specifically, significant differences were obtained on the VCWS #1, 4, 5 (except for typing errors), 6 (excluding time scores compared with the San Diego Employed Worker Group), 8, and the total points scores of the Skill Center group for work sample #11. On these aforementioned work samples, clients performanced significantly slower and/or less accurately than the competitive groups.

Subsequent analysis of performance between subgroups within the RDC client population delineated by age, sex, education, type of disability and employment status revealed significant differences between men-women performance

Table 2

Mean Scores and Comparisons Between RDC Clients and Valpar Norm Groups for Selected VCWS

| VCWS | RDC Clients<br>Mean | San Diego Employed Workers<br>Mean(a) | San Diego Employed Workers<br>T-Value | Skill Centre Low Income<br>Mean(a) | Skill Centre Low Income<br>T-Value |
|---|---|---|---|---|---|
| #1 Small Tools | | | | | |
| Time | | | | | |
| Assembly | 6232.42 | - ** | | 3799.34 | 5.06 * |
| Disassembly | 2645.17 | | | 1518.24 | 5.04 * |
| Errors | 5.92 | | | .82 | 2.21 * |
| #4 Upper Extremity Range of Motions | | | | | |
| Time | | | | | |
| Dominant Hand | 614.07 | 361.51 | 9.42 * | 344.68 | 10.24 * |
| Other | 724.86 | 397.87 | 11.56 * | 399.26 | 10.44 * |
| Disassembly | 850.88 | 494.29 | 18.76 * | 449.26 | 18.93 * |

Note: * = $p < .05$

**-= Not Available

(a) = Source: Valpar (1974). Evaluators' Handbook. Arizona: Valpar

| VCWS | RDC Clients<br>Mean | San Diego Employed Workers<br>Mean(a) | San Diego Employed Workers<br>T-Value | Skill Centre Low Income<br>Mean(a) | Skill Centre Low Income<br>T-Value |
|---|---|---|---|---|---|
| #5 Clerical Comprehension | | | | | |
| Telephone Answering | 37.28 | - ** | | 50.92 | 2.85 * |
| Mail Sorting | | | | | |
| - Time | 1251.03 | | | 680.12 | 4.97 * |
| - Errors | 7.06 | | | 2.32 | 4.90 * |
| Filing Letters | | | | | |
| - Time | 1623.10 | | | 1066.59 | 4.82 * |
| - Errors | 6.47 | | | 3.10 | 2.42 * |
| Bookkeeping | | | | | |
| - Time | 2806.67 | | | 1969.44 | 4.21 * |
| - Errors | 11.15 | | | 8.48 | 1.90 * |
| Typing Words | 121.36 | | | 146.60 | 3.25 * |
| - Errors | 13.74 | | | 10.98 | 1.01 |

Note: * = $P < .05$

-** = Not Available

(a) = Source: Valpar (1974). Evaluators' Handbook. Arizona: Valpar

Table 2 - Cont'd.

Mean Scores and Comparisons Between RDC Clients and Valpar Norm Groups for Selected VCWS

| | RDC Clients | San Diego Employed Workers | | Skill Centre Low Income | |
|---|---|---|---|---|---|
| VCWS | Mean | Mean$^{(a)}$ | T-Value | Mean$^{(a)}$ | T-Value |
| #6 Problem Solving | | | | | |
| Time | 1212.56 | 1089.23 | 1.54 | 795.00 | 4.76 * |
| Errors | 4.11 | .81 | 5.88 * | 2.35 | 2.50 * |
| #8 Simulated Assembly | | | | | |
| Units | 197.33 | | - ** | 240.82 | 4.69 * |
| #9 Whole Body Range of Motions | | | | | |
| Time | 1670.80 | 1326.53 | 8.01 * | 1352.83 | 5.67 * |
| #11 Eye-Hand-Foot Coordination | | | | | |
| Total Points | 137.90 | 158.00 | 1.49 | 162.59 | 1.85 * |
| Time | 532.90 | 565.15 | 0.78 | 576.45 | 1.33 |

Note: * = $p < .05$

- ** = Not Available

(a) = Source: Valpar (1974). Evaluators' Handbook. Arizona: Valpar

on Valpar Component #4, 9, and 11 where men performed faster than women. Physically disabled clients performed slower on Valpar Component #8, 9, and 11 when compared with the emotional and learning disability groups. No other consistent significant differences were noted between pair wise comparison of subgroups based on age, education, employment status and disability groupings. However, the subsequently employed clients of the RDC population evinced lower time and quality scores when compared with the San Diego Employed Worker norms.

## Discussion

The description of norm groups provided by Valpar offers limited demographic information to establish similarities and differences between characteristics of those groups and the RDC population. Valpar gives no descriptive statistical data pertaining to age, sex and education distributions. The bulk of the information focuses on the qualitative traits of the groups.

The San Diego Employed workers are related to selected worker traits arrangements which emphasize an employment value to the assessment of competitive performance. Even if quantitative allocation of workers by trait are omitted, the occupation listing of the Employed Worker Group includes: sorter, machine operator, assembler, fork lift operator, duplication clerk, cashier, bagger, rigger, cableman, warehouseman, electronic assembler, and secretary (Evaluator's Handbook, 1974). These workers held their occupations with satisfactory performance for a minimum of six months.

The Skill Center group comprised unemployed, low income, non-handicapped individuals entering a vocational training program with emphasis placed on mechanical areas.

The two major distinctions which appear to be responsible for performance differences between the client group and the competitive groups are: first, the employee and trainee status of the competitive groups in regards to the rehabilitant status of clients. Second, the competitive groups are non-handicapped where most clients are grouped in either the emotional, learning or physical disability classification.

When considering Valpar's focus on physical ability and coordination for work sample number 1, 4, 8 and 9, factors such as motivation, concentration, tolerance and manual proficiency determine performance efficacy. The labor market or training school settings enable the development of steadiness, precision, ability and stamina for those range of motions of the upper torso and whole body. Thus the competitive group's familiarity with such physical activities augments stringency of performance standards (McCray, 1979, 1980). Although RDC clients were instructed to work as fast and accurately as they could, the competitive groups proved more adept. RDC clients were believed to be less accustomed to the physical demands assessed by the aforementioned VCWS and, consequently experienced slower execution of physical motions. In the case of physically disabled clients, limitations of body mechanics impede the ability to meet the rigors of these manual tasks. The much slower performance evinced by women clients appears to be attributed to the influence of sex stereotyping favoring men in manually oriented tasks.

Valpar work sample number 5 and 6 emphasize attention, retention of instructions, productivity and cognitive abilities for accurate processing of clerical details. On such work samples, clients required more time and performed less accurately than the competitive groups. In general, the RDC clients have not been previously exposed to such skill requirements in a work or training environment, thus mitigating their abilities to assimilate the rudiments of vocational performance.

The inferior level of performance of clients stems mainly from inexperience. However, their vocational handicaps incur problems related to work performance, not only limited to aptitudes and abilities but extending to personality, attitudes, educability, trainability and employability which prevent them from functioning adequately in work settings (Pruitt, 1977). Because of such limitations, they can also be bereft of vocational goals and motivation.

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# VALPAR COMPONENT WORK SAMPLES: A CORRELATION ANALYSIS

**PIERRE DION**

**ABSTRACT:** This study focused on the inter-correlations of the Valpar Component Work Sample (VCWS) number 1, 4, 5, 6, 8, 9, and 11. High correlations were expected between the work samples having similar requirements of physical activities and/or relating to common worker trait groups. A Pearson Product - Moment correlation analysis was applied using data obtained from vocationally handicapped individuals undertaking vocational assessment. Although commonalities exist between selected VCWS, tasks specificity of each VCWS produced findings of medium to low correlations.

The Labor Market encompasses a variety of occupational groups, each comprising composite profiles of required vocational skills. For the vocational evaluator, these profiles represent the basis for conducting vocational assessment. Because qualification factors differ between and within groups of occupations, the evaluator must determine the appropriateness of using assessment instruments that measure abilities related to a particular occupation or applicable to groups of occupations. Among the various tools used in vocational evaluation, work sample systems have been designed to accommodate a single or cluster trait approach to assessment.

The Valpar Component Work Samples (VCWS) are intended to measure fundamental abilities recurrent in several groups of occupations. Developers of the Valpar Component series state that these work samples assess "those worker characteristics which are found to be basic indicators of success in numerous job families" (Brandon, Button, Rastatter & Ross, 1974, p. 1).

But the VCWS have largely been regarded as non-interdependent assessment tools. Botterbush's (1980) review of commercial vocational evaluation systems emphasized the fact that "Valpar is a group of independent work samples and not a system" (p. 75). Consequently, Botterbush (1980) questioned the work samples' relatedness to occupational groups.

Although Brandon, et al. (1974) recommended that the VCWS be incorporated with work sample systems extant, Valpar-Spective (1979) identified essential components which, when combined, consolidate vocational information. Thus, the VCWS can potentially be integrated to form a system of vocational evaluation.

Such integration can be shown from the commonalities that exist for the VCWS numbers 1, 4, 5, 6, 8, 9, and 11. Excepting work sample 5, Clerical Comprehension and Aptitudes, which incorporates several related and often concurrent office duties, the majority of the VCWS measure skills such as manual dexterity and motor coordination. In some cases, several work samples evaluate abilities related to common worker trait groups.

The purpose of this study was to analyze the inter-correlations of the aforementioned VCWS. It was expected that work samples sharing common factors and worker trait groups would produce consistent high correlations.

## Method

### Subjects

Data were obtained from 400 disabled individuals undertaking a vocational assessment at the Resource Development Center, Calgary, Alberta, Canada. Depending on the VCWS administered sample sizes ranged from 38 to 397 clients.

Demographic variables showed the following client characteristics: 90% of the clients were of Caucasian descent with a mean age of 26.7 years, a men/women ratio of approximately 2:1 and a reported education level of 10 years.

Client disabilities were grouped into four categories. In category one, clients were diagnosed as emotionally/psychiatrically disabled. A second category comprised those clients experiencing some type of learning disability in school systems. A third category constituted those clients medically diagnosed as having physical dysfunctions. A fourth category (miscellany) was given to clients who did not easily fit the above disability grouping but were deemed handicapped by nature of having inordinate difficulties procuring or staying with employment. In order, the proportions of clients by disability categories were 40%, 25%, 12% and 23% for the emotional, learning, physical and miscellany groups.

### Instrumentation

Seven Valpar Component Work Samples were used in this study. The work samples were administered following the directions and procedures outlined in the Valpar Manuals.

VCWS 1 - Small Tools (mechanical). Performance is scored on speed and accuracy.

VCWS 4 - Upper Extremity Range of Motions. Performance is scored on speed.

VCWS 5 - Clerical Comprehension and Aptitudes. Performance is scored on speed and accuracy.

VCWS 6 - Independent Problem Solving. Performance is scored on speed and accuracy.

VCWS 8 - Simulated Assembly. Performance is scored on the number of assemblies completed within a time interval of 20 minutes.

VCWS 9 - Whole Body Range of Motions. Performance is scored on speed.

VCWS 11 - Eye-Hand-Foot Coordination. Performance is scored on speed and accuracy.

## Results

The Pearson Product - Moment correlation analysis indicated findings of medium to low correlations between the VCWS (see Table 1).

Highest correlation was obtained between time scores of the VCWS 4 Upper Extremity Range of Motions. This work sample correlated moderately with the VCWS 1, 8, and 9. Other medium correlations were noted between VCWS 8 and 9 and VCWS 11 time and points scores.

The Simulated Assembly and the Eye-Hand-Foot Coordination correlated Negatively with all other VCWS having time measurements.

The VCWS 6 Problem Solving and 11 Eye-Hand-Foot Coordination correlated weakly with all other VCWS.

Table 2 denotes common occupational groups related to VCWS.

Table 1

Correlation Coefficients Between Selected VCWS

| VCWS ** | #4 | | | | #6 | #8 | #9 | #11 | |
|---|---|---|---|---|---|---|---|---|---|
| | BET | DOM | OTH | DIS | PRST | SAP | WBT | EHFT | EHFP |
| #1 - STTT | .40 | .62 | -* | .61 | .38 | -.46 | .49 | -.29 | -* |
| #4 BET | | .87 | .90 | .65 | .38 | -.62 | .64 | -.16 | -.37 |
| #4 DOM | | | .58 | .53 | .32 | -.57 | .54 | -.20 | -.35 |
| #4 OTH | | | | .61 | .36 | -.54 | .58 | -.12 | -.33 |
| #4 DIS | | | | | .30 | -.56 | .64 | -.17 | -.42 |
| #6 - PRST | | | | | | -.36 | .19 | -* | -* |
| #8 - SAP | | | | | | | -.57 | .18 | .36 |
| #9 - WBT | | | | | | | | -.18 | -.43 |
| #11 - EHFT | | | | | | | | | .67 |

| VCWS ** | #5 | | | | |
|---|---|---|---|---|---|
| | TEL | MAST | FILT | BKT | TYPW |
| #6 - PRST | -* | .41 | .51 | .46 | -.37 |

Note: * - = Not significant, p > .05

** VCWS: STTT - Small tools assembly time; BET - Time for both hands; DOM - Time for dominant hand; OHT - Time for other hand; DIS - Disassembly time; PRST - Problem solving time; SAP - Assembly points; WBT - Whole body total time; EHFT - Eye-hand-foot total time; EHFP - Eye-hand-foot total points; TEL - Telephone messages; MAST - Mail sorting time; FILT - Filing letters time; BKT - Bookkeeping time; TYPW - Typing words.

Table 2

Common Occupations Related to Selected VCWS *

| | D. P. T. |
|---|---|
| VCWS #4 and #6 | |
| - Inspecting and Stock Checking | .382, .184, .387, .484, .487 |
| VCWS #4 and #8 | |
| - Sorting, Inspecting, Measuring and related work | .484, .485, .487, .584, .585<br>.587, .683, .684, .685, .687 |
| VCWS #5 and #6 | |
| - Shipping Clerk I | .138 |
| - Office Helper | .878 |
| - Parcel Post Clerk | .388 |
| - Mail Clerk | .588 |
| - Credit Reporter | .368 |
| - Counter Clerk | .368 |
| VCWS #8 and #9 | |
| - Driving - Operating | .883 |
| VCWS #8 and #11 | |
| - Laundry Laboring | .887 |
| - Injecting-Molding-Machine Operator | .782 |
| - Conveyor-Line Operator, Automatic | .782 |
| - Continuous-Towel Roller (Laundering) | .885 |
| - Injecting-Molding-Machine Tender | .885 |
| VCWS #8, #9 and #11 | |
| - Manipulating | .884 |

Note: * Source: Brandon et al. (1974)

From the arrangement of work samples reported in Table 2, correlation remained strongest between VCWS 4 and 8 and VCWS 8 and 9.

## Discussion

The VCWS small tools, upper extremity range of motions, simulated assembly and whole body range of motions share the importance of accurate eye/hand coordination, precise manual dexterity, awareness of spatial relationships, tactile judgement, and prolonged physical stamina. Although commonalities exist among these work samples, task specificity between each component differ considerably. The VCWS upper extremity range of motions examines proficiency of dominant vs other hand. The VCWS simulated assembly requires visual tracking. The various postures assumed by a client on the VCWS whole body range of motions extend the physical requirements to ability and balance of motions. By itself, the VCWS 11 eye-hand-foot coordination measures simultaneous coordinated reactions.

The low correlation obtained between the VCWS 6 problem solving and the other VCWS refers to notable differences of material formats, perceptual and learning processes which define the uniqueness of the task.

Intrinsic factors such as task procedures, interaction of skills, focus of productivity (speed vs accuracy) and work behaviors pertaining to each work sample denote particular arrangement of performance requirements. The arrangement of factors clarify the distinctions between the VCWS. Thus, some VCWS supplement the vocational information gathered from other VCWS in the assessment of qualification factors for related occupations.

Still, the findings of medium to low correlations signify variations of clients' performance on those VCWS. Such variations imply that client performances on those VCWS relating to common worker trait groups are to a certain extent, inconsistent. Consequently, additional assessment covering the occupational groups' composite skills would be required to ascertain a client's qualifications for such type of employment.

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# A PSYCHOVOCATIONAL EVALUATION MODEL: A NEW PERSPECTIVE FOR TESTING HANDICAPPED STUDENTS

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**ABSTRACT:** As the ultimate goal of special education is to provide handicapped students with skills for life successes (not simply to bring them to their optimum achievement levels academically), secondary students must be assessed appropriatedly in career/vocational areas. This paper presents a model of psychological re-evaluation with career/vocational components that can be systematically used in IEP planning.

The ultimate goal of special education is to bring students to a level of independence with skills for employability and successful life adjustment, as compared to simply bringing them to a certain grade level of academic achievement. Supporting statistics, however, from the Second Annual Report of the Congress on the Implementation of PL 94-142 indicate that only 6% of all Individual Educational Programs (IEPs) for 1979-80 contained information on vocational goals for students in the 13-15 age group and for the 16-21 age group 31% had vocational goals (Poplin, 1981). Will (1984) states that the future of youth with disabilities is uncertain as they leave public school and that between 50% and 80% of disabled adults currently are jobless. "Qualification for employment is an implied promise of American education..." (Will, 1984,p.1); thus, the Office of Special Education and Rehabilitative Services has established a new priority to improve the transition from school to the working life for handicapped individuals.

A variety of sources in the literature reflects this lack of commitment toward teaching handicapped students employability skills. Poplin (1981) relates that over one million disabled students lack career and vocational skills to compete for jobs in their communities. Batsche (1981) speaks of the three-fifths of the handicapped populations who are not employed during a typical year. As a graphic illustration of the cost of such unemployed dependency, Batsche (1981) compares the $45 to $200 per day institutional settings cost to the lesser cost for educating a student at Harvard University.

Some handicapped students, however, do achieve vocational education placement, but the validity of such vocational placement is open to question, since these placements rarely are based on adequate assessment information. Vocational teachers report that they are seldom asked to participate in the development of the IEP or to even have an opportunity to review the IEP for handicapped students they teach (Batsche, 1981).

School psychologists, as a rule, are not helping to provide such secondary level vocational assessments. Instead, the main emphasis of school psychologists continues to be ability vs. achievement level orientation, particularly at the elementary level. An involvement at the secondary level has usually been confined to retesting for special education and the referral of students exhibiting severe behavior problems (Hohenshil, 1981). Recently, a major thrust of the leadership of the National Association of School Psychologists (NASP), nevertheless, has been the recognition of vocational psychology as its first speciality in the profession (Fagan, 1981).

In the past some school psychologists have been involved in the administration of vocational assessment batteries to varying degrees. Alcorn and Nicholson (1975) report of their experiences in group administration of vocational batteries for the mentally retarded and low literate under the leadership of the psychologist assisted by evaluation aides. The areas assessed with this battery included verbal and performance scale of intelligence, academic achievement, mechanical aptitude, visual-motor perception, routine clerical aptitude, fine finger and gross arm dexterity, vocational interest areas, and personality assessment. Although the above battery was designed to be a vocational assessment, with minor additions or adjustments in most states these tests would meet the legal requirements for a scheduled reevaluation for secondary students.

The continuing problem appears to be a lack of commitment on the part of school systems toward consciously implementing the goal of educating handicapped students to provide them with life skills for employability, independence, and successful life adjustment. Secondary (junior-senior high) students first need to be assessed to determine their strengths and weaknesses, and current levels of functioning in career/vocational goal areas as well as in academic areas. Since the IEP regulations in PL 94-142 specify that goals and objective are to built upon the present levels of performance (Federal Register, August 23, 1977) appropriate evaluation adding a vocational component to this reevaluation for all thirteen to fifteen year old would enable career/vocational education goals to be written into IEPs before entry into high school programs.

If the ultimate goal of special education is to not only bring handicapped students up to their optimum achievement levels academically, but to provide them with skills for life successes, then secondary students need to be assessed appropriately in the career/-vocational areas. If the psychological reevaluation were to have career/-vocational components, these assessments could then be systematically used in planning for necessary career/-vocational components in a handicapped student's IEP. Such a composite evaluation for secondary handicapped students offers the school psychologist, for the most part, a different perspective to the traditional reevaluation. In a sense, the school psychologist is not simply testing for a current level of functioning and diagnosis, but is looking toward a future prognosis.

## The Proposed Model

Reevaluation of each teenaged handicapped student is recommended to include areas of: (1) intelligence; (2) achievement; (3) social-emotional behavior; (4) interests; and (5) aptitude. The Psychovocational Model, using a multi-disciplinary team approach, may include a variety of person within the student's ecological system: regular and special education teachers, guidance personnel and social workers, vocational education teachers and vocational rehabilitation counselors, school psychologists, paraprofessionals, and others in the school and community setting who may be able to provide input into such a composite, ecological evaluation. Additionally, the tole of parental involvement and self-evaluation procedures utilized with the student play an integral part in the overall psychovocational evaluation. According to Mutter & McClung (1981), more than simply determining vocational potential is involved in making a prognosis. Since many employees are not able to keep jobs because of poor interpersonal relationships, the area of future work habits/adjustment needs to also be included in the composite evaluation by obtaining observational data of students trying out real jobs either "on site" or in work samples. Thus, the psychovocational evaluation needs to predict the skill potential as well as the social and attitudinal adjustments needed for successful future work.

## Intelligence

An individually administered intelligence test is given to students by a qualified psychologist. Among the assumptions underlying test selection are comparable acculturation and adequate behavior sampling (Salvia & Ysseldyke, 1981). The more commonly accepted tests in school settings for secondary students are the Wechsler intelligence scales, WISC-R or WAIS-R and the Stanford--Binet Intelligence Scale. The appropriate Wechsler scale is generally used because the devices are technically adequate and allow the examiner to look at more than global verbal, performance, and/or full-scale scores. The WISC-R and WAIS-R provide information related to individual performance on the subtests of the instruments (Salvia & Ysseldyke, 1981). For those students whose level of functioning falls below the lower range of the Wechsler scales, the Stanford-Binet is generally the instrument of choice. However, the standardization procedures of the 1972 Stanford-Binet cause the examiner to interpret the results with caution (Salvia & Ysseldyke, 1981).

The IQ score, in and of itself, has limited usefulness in vocational planning since the relationship between intelligence and vocational success remains unproved (Kolstoe, 1961; Elkin, 1968; Song & Song, 1969). The Wechsler scales subtest scores and an item analysis of behavior samples on the Stanford-Binet can be very useful in indicating specific strengths and weaknesses that could be used for vocational planning (Brolin, 1982). according to Salvia & Ysseldyke (1981), intelligence tests sample behaviors and no one test samples all of the possible behaviors of intelligence. However, behaviors sampled by intelligence tests such as the Wechsler scales or the Stanford--Binet may include: (1) discrimination skills: generalization skills; (3) perceptual-motor skills; (4) general information; (5) vocabulary; (6) induction and reasoning; (7) comprehension; (8) sequencing; (9) detail recognition; (10) analogies; (11) abstract reasoning; (12) memory; (13) pattern completion; and (14) attention. A correlation of these sampled behaviors from the intelligence tests with addition tests that measure preceptual-motor functioning, such as the Bender Visual Motor Gestalt Test or the Visual Motor Integration test, and with those that measure language abilities, such as the Test of Adolescent Language, or the Detroit Tests of Learning Aptitude (Revised, 1984) that helps identify intraindividual strengths and weaknesses and specific aptitudes can be useful in supplying vocational-oriented information. Generally, such traditional evaluation procedures used by school psychologists can be modified to elicit data relevant to career/vocational planning. Thus, according to Levinson & Shepard (1982) the school psychologist does not need to "turn entirely to alternate strategies in collecting and reporting information pertinent to...occupational development." (p. 69)

## Achievement

Relative to academic achievement and performance levels, both norm-referenced and criterionreferenced tests and teacher evaluations of classroom performance would be useful vocational planning information. For global skill information, tests such as the Wide Range Achievement Test WRAT) or the Peabody Individual Achievement Test (PIAT) are often used to estimate the student's current level of functioning. For more specific information in pinpointing a student's strengths and weaknesses in academic-related areas, a diagnostic achievement should be utilized. A test with adequate behavior samples can assist in analyzing the student's performance on essential skills that will enable them to function with the greatest degree of independence as a citizen and worker in society. One example of such a test is The Brigance Diagnostic Inventory of Essential Skills. In addition to diagnostic material on basic skills, several inventories of vocational relevance are also included such as self-concept rating scale, attitude rating scale, job interview rating scale, and communication skills rating scale. The scales can be used by observers rating the student or by the student as self-reporting scales. A career-oriented approach to academic achievement is found in the Life Centered Career Education: A Competency Based Approach (Brolin, 1983). These materials infuse specific competencies for life skills with academic skills and includes assessment and IEP planning forms. Personnel involved in assessing academic achievement may include, not only the school psychologist, but teachers and other educational specialists, including well-trained paraprofessionals.

## Social-Emotional Behavior

Socialemotional assessment is a particular significant component of the overall psychovocational evaluation. The observations, evaluation, and selfevaluation of social competence/-skills and emotional behaviors, feelings, and attitudes will give insight and information to the vocational planning for handicapped students. No single evaluation method can provide the necessary information related to social skills. Among those procedures generally acceptable for gleaning adequate information are: 91) checklists and questionnaires, interviews, and rating data from parents, peers and teachers; (2) self-report checklists and inventories, and (3) direct behavioral observations. According to Houff (1982), a "combination of methods are required to establish... particular social skills...and assess how the social environment interacts to produce an individual's level of occupational social competence."(p. 66) Among test used for assessing adaptive behavior are the AAMD Adaptive Behavior Scale-Revised or the Vineland Social Maturity Scale-Revised and for assessing maladaptive behavior are rating scales such as the Burks' Behavior rating Scales or the Behavior Rating Profile.

For a more detailed measure of those items necessary for independence and successful life adjustment, the use of Social and Prevocational Information Battery is recommended with EMR students and Form T of this tool for moderately retarded persons (Halpern, et al, 1982). Additionally, the Career Adaptive Behavior Inventory (CAB) for younger disabled students aged three to fifteen years can be useful (Lombardi, 1980). For those adolescents and adults suspected of lower intellectual functioning, psychiatric disorders, and social disadvantagement, the Street Survival Skills Questionnaire is suggested (Halpern, et al, 1982). The lack of appropriate social skill more often than lack of job skills has been identified as a major reason handicapped student's do not keep jobs upon leaving school (Brolin, 1973; Mori, 1979). Therefore, the assessment in the social-emotional area is important for successful work adjustment.

### Interest

The well-known and commonly used interest inventories such as the Strong Vocational Interest Blank and the Kuder would probably be of limited usefulness here because of their dependence on verbal abilities (Brolin, 1982). Even with reading each item to the student, the results would be invalid if the student did not have a highly developed receptive language, in addition to changing the normative data standardization procedures. Picture inventories may be more appropriate tools for eliciting valid information from some handicapped students. Two such picture inventories have been developed specifically for use with and normed on the retarded: Reading Free Vocational Interest Inventory (Revised) and Vocational Interest and Sophistication Assessment (VISA). The former test measure high-low vocational interest in thirteen job clusters and the later measure job knowledge in each area in addition to interest in ten areas (Parnicky & Presnall, 1980). For more complex picture interest inventory, the Geist Picture Interest Inventory contains detailed pictures of higher level occupations (Brolin, 1982). Designed for and normed on low literate persons is the Wide Range Interest Opinion Test (WRIOT)Revised (Alcorn & Nicholson, 1975).

### Vocational Aptitude

In the assessment of aptitude for certain vocational tasks requiring motor coordination, some measure of dexterity is generally given. The choice of the instrument depends on the type of dexterity to be measured. For example, the Purdue Pegboard measures gross movements of hand, fingers, and arm as well as tip of finger dexterity. Crawford Small Parts Dexterity Test measures fine eye-hand coordination and the Minnesota Rate of Manipulation Test assesses arm-hand dexterity. Bennet hand Tool Dexterity Test measures proficiency in using ordinary mechanics tools, thus assessing both mechanical ability and previous experience in handling tools. According to Overs (1970), standardized tests of manual dexterity predict as well as job sample tasks and may be administered in a much shorter time. Additionally, the administration of a dexterity test is also a learning experience for the handicapped student--as in the adult world, industries also administer dexterity tests for applicant selection.

### Work Evaluation Systems

The market-place is saturated with commercial work evaluation systems which are for the most part costly and time consuming to administer in their entirety. The advantages of using such a system, however, are that it (1) tends to motivate students because the work samples are more like real job task than paper and pencil assignments; (2) provides important observation information that can help to predict functional ability; (3) provides experiences for hands-on testing following oral directions; and (4) allows for experiences that will be helpful in program and career planning (Scott & Sarkees, (1982). According to Tellefsen (1982), the most reliable vocational information is, form long-term observation in an actual work and interactional social behaviors. Although the most effective method to measure vocational potential is job try-out, it is also the most expensive and often the least feasible; therefore, the work sample approach provides a higher predictive validity than does standardized paper and pencils tests (Mutter & McClung, 1981).

### Locally Produced Work Samples

The purchase of a commercial work evaluation system to use the work sample form of assessment is not necessary. Work samples may be locally developed to represent jobs that actually exist within the specific region. Work sample development, however, is a tedious process which requires time to establish local norms (Sitlington & Wimmer, 1978). Work samples could be administered and/or developed by vocational education teachers and counselors or vocational rehabilitation personnel.

## Summary

Vocational assessment is an integral component in the process of providing handicapped students skills for employability, independence, and successful life adjustment. When psychological reevaluations contain vocational components, data can be generated for use in career/ vocational planning. the inclusion of the vocational data into the written psychological report should not significantly alter the format of the report, but should be integrated into the different phases of the report. Thus, vocationally relevant conclusions and recommendations will be written with other summary statements and suggestions (Levinson & Shepard, 1982). The school psychologist is a part of the multi-disciplinary evaluation team that can make a significant impact on the career/vocational directions of handicapped students.

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# EVALUATION OF PREVOCATIONAL SKILLS IN PUBLIC SCHOOL SETTINGS

**RICHARD D. PHELPS**

**ABSTRACT:** There is an increasing demand among employers for workers to demonstrate proper prevocational related concepts prior to entering the world of work. This is particularly true of students who have limited academic abilities and thus may have difficulty acquiring needed technical information. This article will outline the more critical prevocational skills, indicate methods of assessment in a vocational evaluation situation, and remediation in special education settings.

Vocational evaluations of handicapped students in school settings are becoming increasingly popular nationwide. These evaluations usually take place in the ninth or tenth grades and can greatly assist in determining occupational preferences, individual learning styles, and vocational aptitude levels. Because of this, school officials can, by means of the I.E.P. process, determine vocational placement alternatives in the least restrictive environment. This process can also be extremely helpful for devising methods of providing feedback to instructional staff concerning concepts typically defined as prevocational skills. This article will list some of the most common prevocational skills and suggest methods for their assessment and dissemination to special education instructional staff.

## What are Prevocational Skills?

Prevocational skills may be defined as the battery of traits, qualities, and attitudes typically desired of employees in working situations. This does not include the more complex technical skills a person may acquire in vocational training programs or through experience in a specific occupation. Listed below are some of the more commonly indicated prevocational skills based upon employer interviews and industrial surveys.

1) Punctuality
2) Attendance
3) Respect of supervision
4) Work quality
5) Neatness
6) Attending to task
7) Organization of work
8) Getting along with others
9) Occupational awareness
10) Physical conditioning and health
11) Following instructions
12) Maintaining an even disposition
13) Basic communication skills
14) Clean and neat appearance
15) Honesty and dependability

16) Applying reading and arithmetic
    to working situations
17) General safety practices
18) Working independently
19) Verbal communications skills

### Methods of Prevocational Assessment

Many methods exist for the assessment of prevocational skills. One of the most frequently used methods involves long term observation in simulated working situations. An evaluator can present the student with various locally developed work samples or job tasks and can record the frequency of certain prevocational behaviors over an extended period of time. Unfortunately, this method of assessment is becoming less feasible due to evaluation time constraints and increased numbers of students referred for assessment. Instead of abandoning the idea of prevocational skill assessment completely, substitute methods may be used to gain needed information without large amounts of time being involved. Several of these methods are described below.

First, an evaluator may select a work sample system which includes sections devoted to behavioral observation in critical areas. Examples of these systems are the Jewish Employment Vocational Service Work Sample System (1973), the VALPAR Component Work Sample System (1974), and the McCarron-Dial Work Evaluation System (1976). Besides giving an evaluator critical information regarding vocational aptitude levels, these systems, and others, provide a format by which some of the indicated prevocational concepts can be observed, recorded and compiled in an effort to establish certain behavioral patterns.

Second, specific, prevocational related, evaluation test may be utilized to gain information regarding some specific concepts. The Street Survival Skills Questionnaire (1976) and the VALPAR Prevocational Readiness Battery (1980) are examples of these tests which may be purchased separately and can be included in an existing vocational evaluation process.

Third, a specific checklist may be utilized to pinpoint specific prevocational concepts which are in need of remediation. Examples of such checklists include the MDC Behavior Identification Format (1974) and the Hamilton County (Ohio) Work Study Program Student Profile (Kaplan, 1977). These checklists along with other similar models available are extremely useful because they not only allow for completion during the evaluation process but can be utilized at subsequent dates to indicate student progress in specific areas.

Fourth, a prevocational checklist may be completed prior to the vocational evaluation or during the intake/orientation process. With this method, a special education teacher, school counselor, or an evaluator can quickly complete a form by means of past observations, student interviews and/or school records. This type of format is particularly helpful in situations where evaluation time is limited. Figure 1 contains an example of such a checklist which may be utilized or may serve as a basis for the development of a model which is specific to the needs of an individual school system.

### Evaluator Input to Special Education Curriculum Planning

As professionals knowledgeable in the world of work and the demand of employers, Vocational Evaluators can be of valuable assistance to special educators in the area of curriculum development. Based upon vocationally related strengths and weaknesses indicated in the assessment process, the evaluator may be able to offer suggestions as to the remediation of certain prevocational concepts. Hints may also be given as to some critical skills needed by students prior to entering vocational training or working situations. This may assist the special education teacher

Figure 1

## Intake/Referral Form

Full Name__________ Nickname__________ Date__________
Grade__________ Class Placement/Exceptionality__________
Address__________ Phone__________ Emergency Phone__________
Father's Name__________ Occupation__________ Phone__________
Mother's Name__________ Occupation__________ Phone__________
Achievement Data: Arithmetic__________ Source__________
Reading__________ Source__________
Vocabulary__________ Source__________
__________ Source__________
Social Maturity Level__________ Source__________
Attendance: School Year 84/85__________ Number days absent__________ Tardy__________
School Year 83/84__________ Number days absent__________ Tardy__________
School Year 82/83__________ Number days absent__________ Tardy__________
Medical/Physical Limitations__________
Medication (If any)__________
Indicated Occupations of interest__________
Indicated Vocational Programs of interest__________
Past Vocational Training__________
Past Employment__________

| Please Check | very appropriate | adequate | inappropriate | N/A | Comment |
|---|---|---|---|---|---|
| Move quickly and efficiently between work tasks | | | | | |
| Has necessary materials ready | | | | | |
| Completes tasks quickly | | | | | |
| Works independently without unnecessary assistance | | | | | |
| Completes tasks efficiently/ accurately | | | | | |
| Follows through with tasks until complete | | | | | |
| Attending to tasks | | | | | |
| Continues work tasks when teacher is out | | | | | |
| Follows verbal instructions | | | | | |
| Follows written instructions commensurate with reading level | | | | | |
| Follows a model or diagram | | | | | |
| Handles equipment safely/ properly | | | | | |
| Honesty | | | | | |

|  | very appropriate | adequate | inappropriate | N/A | Comment |
|---|---|---|---|---|---|
| Dependability/Trustworthy |  |  |  |  |  |
| Level of self confidence |  |  |  |  |  |
| Easily frustrated by difficult tasks |  |  |  |  |  |
| Easily bored by repetitive tasks |  |  |  |  |  |
| Demonstrates good study skills |  |  |  |  |  |
| Completion of homework/ outside assignments |  |  |  |  |  |
| Accepts new tasks without complaint |  |  |  |  |  |
| Courteous/good manners |  |  |  |  |  |
| Maintaining good health practices |  |  |  |  |  |
| Clean and neat appearance |  |  |  |  |  |
| Works well with other students |  |  |  |  |  |
| Displays respect for supervision |  |  |  |  |  |
| Accepts constructive criticism |  |  |  |  |  |
| Effectively communicates needs |  |  |  |  |  |
| Performs work neatly |  |  |  |  |  |
| Cleans up after work tasks |  |  |  |  |  |
| Properly organizes work tasks |  |  |  |  |  |
| Can complete personal information form |  |  |  |  |  |

Has student been referred to school officials for discipline related problems?________

Briefly explain:________________________________________ ________________________

Has student made recent progress in areas related to discipline problems?

______________________________________________________________________

in combining the teaching of basic academic competencies with needed functional concepts which may serve to increase student motivation and increase the learning process. Listed below are a few hints and suggestions possibly gained from assessment. Although certainly not complete, they may serve to generate the development of creative instructional planning relating to prevocational skills development. Also included is a listing of general recommendations which an evaluator may find helpful to include in an assessment report to school officials.

1) Bringing industrial representatives to the classroom to discuss concepts required for working in particular settings. Have these representatives discuss the traits, qualities, and attitudes needed along with academic requirements and opportunities for advancement.
2) Develop slides showing individuals actually performing jobs in the local community. Discuss dress requirements, environmental demands, skills being used, physical qualities of workers, safety concepts, and level of supervision.
3) Look beyond the area of home economics and science when teaching liquid measures. Include activities relating to food service, mechanics, plumbing, and custodial occupations.
4) Writing and punctuation skills can be further developed with job applications, insurance forms, invoices and inventory control forms.
5) Increase sight word vocabulary and phonetic skills with terms common to industry in the geographical area.
6) Dictionary usage activities can be expanded to include tool catalogs, parts books, wholesale order pamphlets, and Department of Labor texts.
7) Expand activities using the yellow pages to areas and locations of potential employers.
8) Utilize the city map to chart certain delivery routes used by employees of distributing companies: soft drink, beer, office supplies, commercial foods, lumber, welding supplies, etc...)
9) Expand the terms used in safety activities to include works, phrases, and procedures common to local industry.
10) Plan activities which encompass the entire process of locating and securing employment.
11) Visit local industries in order to have students learn first-hand information pertaining to job securing and job retaining skills from individuals who actually do the hiring and firing of workers.
12) Utilize activities which allow for the transfer of critical math activities. These include:
    a. Complete stock requisition forms
    b. Compute sales tax
    c. Complete inventory control forms and compute gross and net value of stock or materials on-hand
    d. Determine discounts and whole sale/retail price
    e. Compute overtime payments and rates of pay
    f. Utilize vocational activities relating to fractions, decimals, and the metrics system
13) Incorporate the concepts of personnel budgeting with budgeting practices associated in running a small business such as lawn care, home banking, and newspaper delivery.
14) When teaching linear measure, incorporate actual measuring instruments encountered in industry. Also utilize the concept of closure. If a

student is to measure a stock of wood, have her/him cut the wood with a hand saw.

15) Objectives relating to personal health care can be expanded to include skills needed for workers in child care and health occupations.

## POTENTIAL RECOMMENDATIONS FROM EVALUATION TO LOCAL SCHOOL OFFICIALS

Practical home and work related science concepts
Dressing and grooming for employment situations
Budgeting and consumer economics
Increased sight work vocabulary of basic survival and occupational terms
Familiarization with methods of seeking employment
Interview techniques
Familiarization with services offered by public agencies (VRS, etc.)
Methods of keeping employment and job advancement
Comprehension of fractions and linear measures to 1/16 inch
Detailed knowledge of personal data in order to complete occupational and practical living forms
Familiarization with basic hand and power tools and their usage
Making change and counting money
Telling time
Using a calendar
Using the telephone for calling, answering, and taking messages
Alphabetically arranging by letter
Serially arranging by number
Job safety practices
Driver education
Simple message writing
Reading dials, gauges, and thermometers
Simple sorting by physical property (color, size, etc.)
Reading road signs
Using a telephone directory
Familiarization with basic units of measure
Awareness of different occupations and individual concepts of each
Utilizing the resources of a local newspaper
Work quality and neatness
Punctuality and attendance
Intensive physical education program, emphasizing endurance, speed and strength development
Work with peers and supervision in a cooperative manner

NOTE:

When including above information on evaluation reports, it may be helpful to draw a short line in the left column in order to indicate, by checkmarks, those areas which are in particular need of remediation.

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# THE REGIONAL VOCATIONAL ASSESSMENT CENTER: MEETING HIGH SCHOOL STUDENT VOCATIONAL NEEDS

DEBRA L. KAPLAN

**ABSTRACT:** While Individual Education plans contain a vocational component for older handicapped students, this component, unlike academic components, is often designed with little, if any, assessment information. Because of the high cost of providing comprehensive vocational assessment services within a school district and because of the paucity of trained vocational educators in the Pacific Northwest, few districts conduct meaningful vocational assessments with their students. In some districts, personnel are forced to assume evaluation duties for which they were not adequately trained. This situation often leads to inefficient evaluation programs and frustrated professionals.

Washington State recognized the need for comprehensive vocational evaluation services and so the Office of Superintendent of Public Instruction (OSPI) funded RVAC -- the Regional Vocational Assessment Center. OSPI funding and University of Washington expertise have produced a model evaluation program that is meeting school district needs. Now Washington schools have the precise information their staff need to develop meaningful vocational programs for handicapped young adults.

RVAC has assessed students from approximately 40 school districts in 18 months. RVAC has also evaluated individuals for foster care agencies, the Department of Rehabilitation Medicine at the University of Washington and the State Department of Vocational Rehabilitation. Evaluees include teenagers and adults with a variety of disabling conditions including developmental disabilities, neurological impairments, physical impairments, and persons with industrial orthopedic injuries. RVAC also assesses a large population of adjudicated youth as part of a transition project that prepares incarcerated teenagers for re-entry into the public school system.

## The Problem

Public Law 94-142 encourages schools to provide all disabled students with vocational education. Leadership and the movement to provide such education became aware of the need to support a student's vocational placement with accurate information regarding his/her aptitudes and potentials. The notion was that the absence of such information might lead to inappropriate placements of students who would then be exposed to failure at their first vocational endeavor.

The need for vocational assessment in the schools has been amply documented. In a survey of Texas educators, Peterson (1981) found that over 80% felt that comprehensive vocational assessment was critical to develop appropriate educational programs for secondary age handicapped students. The National Association of Vocational Education Special Needs Personnel Committee on Vocational Assessment (McCray, 1981) indicated "all vocational training plans for special needs students should be based on vocational assessment information" (p.20).

Establishing vocational assessment programs within school systems was a unique challenge for educators because vocational assessment, as we know it today, was primarily the invention of vocational rehabilitationists. If we assume that vocational assessment is a scientific process requiring not only skills in measurement, but also trained counseling skills and a sensitivity to observed behaviors, then we must acknowledge the need for professionals trained in all aspects of this process to develop and coordinate accountable and effective programs. Schools attempting to replicate this process found it necessary to rely on the expertise of professionals within the field of rehabilitation. However, without policies for certifying these professionals, schools were able to pass the responsibility for development of assessment programs to various school personnel, such as special education teachers, vocational education teachers, school psychologists, etc. While these professionals were skilled in their areas of expertise, they did not have the knowledge needed to conduct vocational assessments or to develop comprehensive vocational assessment programs. Therefore schools relied on manufacturers of assessment instrumentation for training.

When discussing the use of commercial work sample systems, Brolin (1982) stated "the critical shortage of trained evaluators created by the increase in demand has forced administrators to seek a 'system' instead of a qualified evaluator" (p.133). He further asserted, "because of the shortage of qualified vocational evaluators, many evaluation programs just do not have the expertise to tailor and make their own work sample systems" (p. 136). While manufacturers' training teaches the fundamentals of the process, school professionals did not have the benefit of long-term training or working with a mentor through internships. Consequently, many school professionals were presented with a task which was often times beyond their level of expertise -- to design a vocational assessment program which could effectively measure the vocational abilities of large numbers of students with varied disabilities and communicate the results to parents, students, and teachers.

This is essentially what occurred in Washington State. Because of a lack of trained vocational evaluators, teachers found themselves in new positions, creating vocational assessment programs with little technical assistance. Several problems resulted. Although students are being assessed, the information was not being used by classroom teachers to develop vocational programs, largely because they were not able to interpret the results. Also, in many cases the recommendations offered did not relate the programs available through the school district. All community resources and post-secondary training options available to the student were not reflected in the transition process for graduating students. Many evaluators found special education teachers resistant to recommendations and vocational education instructors opposed to inclusion of disabled pupils in their classes. Consequently, vocational evaluation reports were filed after failing to offer vocational direction. Many school districts found evaluation equipment collecting dust while school professionals and parents remained disillusioned regarding the subject of vocational assessment. While larger districts have been able to design and maintain effective programs by employing persons trained in vocational evaluation at leading institutions, smaller districts are unable to provide this much needed service to their special needs students. Hence, many students are at risk for being placed inappropriately and for leaving high school with few vocational skills and little knowledge of resources available for post-secondary training.

## The Solution

In answer to this dilemma, the Regional Vocational Assessment Center (RVAC) was established in 1982 at the University of Washington to meet the needs of the many school districts that are unable to provide assessment services to disabled students. The concept of a regional evaluation center was realized by the University of Washington and the Office of the Superintendent of Public Instruction as a means of offering low cost, efficient services for many school districts. Being located at the

University of Washington allows the Center to draw upon many resources, including specialized training centers for handicapped adults and on-campus work stations. RVAC was designed to serve persons with a large variety of disabilities, including students with learning disabilities, behavior disabilities, those that are developmentally delayed, orthopedically impaired, neurologically impaired, juvenile offenders, youths in foster care, industrially injured adults, and handicapped adults referred by the Department of Vocational Rehabilitation.

In designing the program, great emphasis was placed on the service delivery model to ensure accountability and integration with large numbers of school districts. Therefore, the model was designed to maintain flexibility so that the program could be modified to meet the needs of such diverse populations as incarcerated youth, the developmentally disabled, and students from rural environments.

### Pre-Assessment Meeting

Prior to assessing students, and in order to ensure accountability, each school district that refers students to the RVAC for an assessment is visited so that program availability and entry requirements for existing programs can be determined. While this is a simple procedure in some districts many districts have no specific vocational programming available for disabled students. In such situations, the evaluator works with the referral source to locate possible training options on campus and in the community. In many cases, the evaluations are used as a needs assessment by districts so that programs can be designed to meet the specific training needs of the student population. The pre-assessment visit is one of the most significant aspects of the model because it increases the probability that recommendations reflect program availability. A vocational plan of action can be grossly ineffective in spite of a seemingly brilliant design if it requires resources beyond the capability of the district.

### Referral

The referral process at the RVAC was designed to be simple but complete. A referral form requests for each student a description of the vocational development problem, specific questions which need to be answered by the assessment, and basic data necessary to understand the needs of the student. Such data include the results of psychometric tests and information regarding the disabling condition, physical limitation, expressed and/or tested interests, work experience, leisure time activities and social/environmental background. Recent psychological, medical, or neuro-psychological reports are requested. Referral sources also submit the student's most recent individual education plan. Some special education teachers are unfamiliar with vocational assessment, and in such cases, the referral form is completed with the evaluator so that the teacher can learn what to expect from an evaluation. This has proved to be an effective educational process for teachers and guarantees that the evaluation will meet their expectations. It also encourages teachers to refer students for specific reasons, rather than for general assessment, which usually eludes follow-through.

### Evaluation

At RVAC, a 4:1 client-to-evaluator ratio is maintained, and a 4-day evaluation period is the accepted norm. However, scheduling is flexible, given the variable work speeds of the client population. The 5th day is used for report writing.

Upon arrival at the center, all students are given an orientation as well as a brief tour of the facility. An initial interview is conducted with each student. This interview is a crucial part of the evaluation since it is used to establish rapport with the students and to validate data included in the referral form. During this first meeting, the evaluator, along with the student, completes an Individual Evaluation Plan (IEP) which outlines what will take place during the assessment, and lists work samples and tests that will be administered to answer the referral questions. This process has been found to be extremely effective as it involves a student in the decisionmaking process. In fact, students are encouraged to work independently and to make decisions throughout the evaluation. In many cases, we find that students are surprised and a bit uneasy when having to make decisions regarding their own education. Some students find the independent responsibility assumed at the assessment quite unusual, given the rote schedules they maintain at school.

RVAC utilizes paper and pencil psychometrics and commercial evaluation systems such as JEVS and Valpar as well as self-developed work samples to assess students. While the model does not discourage a generalized approach to vocational assessment, it does not sanction administration of all work samples to an individual. Utilizing a prescriptive format, students are only administered those work samples that will answer the questions included on the referral form or those that will increase the student's exposure to occupational domains where he or she has suggested an interest.

Post sample interviewing encourages students to express feelings about a certain activity and to make a decision about whether or not they would want to perform this type of work in a job. Again, students are encouraged to make decisions throughout the assessment, since this is an essential element in vocational development that usually goes unstressed in the school environment.

Many students lack exposure to the world of work and find it difficult to engage in discourse regarding the topic. Their perceptions have been influenced by their lifestyles, which may include unrealistic ideas about common occupations. (We have seen students who associate Magnum P.I. with private investigation and are therefore interested in this as an occupational goal.) In order to increase the students' awareness of the work world, group and individual values clarification exercises are used to promote open discussion about issues such as job satisfaction, salary and benefits, work environment, etc. Students are also taught to conduct occupational research by using a structured interview to find out about jobs held by friends or relatives. Through this method students are taught to converse with others in a professional manner and to inquire about necessary information such as specific job tasks, specialized equipment, training and qualifications, remuneration, and job availability. Students are encouraged to use these techniques when searching for employment or making a decision about a specific occupation.

To meet the needs of specific populations, the evaluation process and the instrumentation is continually modified. For instance, developmentally delayed individuals are frequently readministered specific work samples to assess learning ability through practice and the use of specific training strategies. While destandardizing tests administrations invalidates normative data, this strategic method of assessment is particularly important for this population given their failure on traditional assessment batteries. All modifications are described in the vocational evaluation report. RVAC has also developed work samples which measure the entry level abilities needed to be eligible for post-secondary training programs for developmentally disabled adults. This results in replication of the training methods used in these programs to predict client success.

An interim interview midway through the evaluation is used to modify the IEP if necessary. During the exit interview, the evaluator shares results with the school district, community or adult agencies. The student and the evaluator together design vocational options for the student which will be described in the evaluation report and shared at a staffing following the assessment.

### The Vocational Plan

Collecting information regarding a student's vocational potential is only part of the evaluation. Far more crucial is the way the information is interpreted and presented. This is why an evaluator's counseling and resource skills are so important. If a person's vocational skill level were the only predictor of vocational success, the chore would be simple. However, a variety of factors determine success, including motivation, job seeking skills, independent problem solving, job availability, etc.

All of these factors are considered during the highly individualized process of plan development. Occupational research and investigation of community programs or agencies is often performed by the evaluator to determine the likelihood of an individual's success, or to locate specific services needed to enhance a student's vocational skills. This way, the evaluator can be certain that recommendations are based on available resources. Also, rather than reporting only evaluation results and general recommendations, the evaluator offers the student and teachers a prescriptive plan for vocational development. For instance, recommendations for developmentally disabled students not only include occupational areas for training, but also specific training strategies which may produce competitive employment skills with individual students in either skill acquisition or work adjustment.

The evaluator must be responsible for creating a vocational plan of action which can be implemented. A vocational evaluation specialist must understand the relationship between evaluation results and implementation of habilitation plan. Therefore, the evaluator must use counseling, testing, and behavior observations to assess students and to identify a vocational path. For instance, a student may possess skills at a competitive level, but a lethargic approach to the evaluation and school work in general may indicate potential failure in a job. This, along with recommendations for remediation are communicated to the student and the referral source.

### The Staffing

Each student evaluated at RVAC attends a staffing along with parents and/or guardians, the evaluator, and significant school personnel, including teachers, psychologists, etc. The staffing is used to communicate and explain test results and recommendations which are contained in a narrative style report and distributed to all in attendance. More importantly, however, the staffing is used to modify any recommendations that may be unrealistic and to solve problems that may be associated with implementing the plan. All who attend the staffing are asked to respond freely with suggestions for improving the plan since they are usually better acquainted with the student's history and behavior and will also be instrumental in following through with the plan of action. Before the staffing is terminated, the next step in habilitation process is identified along with the persons responsible for carrying it out.

### Follow-up

A brief follow-up questionnaire is completed by each referral source approximately 6 months after the evaluation takes place. Occasionally, RVAC is consulted later in the training process if the plan has been unsuccessful and modifications are necessary or just for input when the student's program is at a turning point.

## Impact

RVAC has had a great impact on the education of disabled students in its first two years of operation. One of the most significant aspects of the service delivery model is that it operates from a non-biased objective position as a centrally located resource for many school districts. This has been found to be extremely effective with school districts, parents, and human service agencies, as the evaluator is able to maintain clear objectivity. The model has proved that an outside consultant has greater success at offering recommendations than a school-based evaluator because he or she is able to discuss sensitive habilitation issues that school personnel may feel uncomfortable with, given their close relationship with the student's family and their professional peers.

Confronted with initial resistance from school districts reluctant to use assessment because of previous disappointments, RVAC has educated many professionals and parents about accountable assessment and referrals tripled during the second year of operation.

A follow-up study conducted after the first year of operation received an 86% response rate. The study indicated that 50% of the referral sources were able to implement the vocational plan of action. The other 50% were unable to implement the plan because students left the district or the responsibility had shifted to another professional who had not been involved in the evaluation process. Eighty-six percent stated that vocational plans were based on available resources and 100% stated that they would utilize RVAC's services again.

## Conclusion

At the present time there is no established model for vocational assessment within the schools. While several models have been tried and professionals debate the assets and limitations of proposed models, a standard format has not been designed, tested, and adopted.

The Regional Vocational Assessment Center operates with a model which offers low cost, highly individualized and accountable services to many school districts through a central location in Washington state.

There are several goals that the RVAC plans to achieve in the future. First, while this model has proved to be effective, it has not been subjected to statistical scrutiny through research. Also, its location limits its service delivery to a specific geographic region and additional regional centers are needed in strategic locations throughout the state. Projects related to both these issues will be considered. Secondly, vocational assessment in the schools now takes on even greater importance with the federal government's new emphasis on transition, since evaluation is actually a link between a student and services. The RVAC hopes to continue its involvement in the transition process by utilizing vocational assessment as linkage between secondary and post-secondary vocational training programs.

With support from the state, RVAC has been able to offer direct service to school districts and their students. However, in keeping with their current policy to grant funds for direct service to school districts only, the RVAC's funding has been cut considerably. The response from districts who have relied upon services from the RVAC has been overwhelming and RVAC will be able to continue operating with support from districts who have recognized that vocational assessment is crucial in the vocational development of handicapped youth.

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# SERVICES OF A SPECIAL NEEDS EVALUATION CENTER: HOW USEFUL ARE THEY TO A VOCATIONAL INSTRUCTOR?

KENNETH W. BOHNENSTIEHL

**ABSTRACT:** This research project addresses services derived from vocational evaluation and examines their usefulness to vocational instructors working with special educational students.

The study shows that traditional interpretations of vocational evaluation data are useful and can be further interpreted to provide instructors with valuable information.

## Statement of Problem and Rationale

Mainstreaming special education students in regular classes has caused concern to regular education teachers. "What can we do with these students?" is a question often asked by regular educators. Mainstreaming special education students vocational programs generates similar questions and concerns. To assist a teacher receiving a mainstreamed special education student, information on that student's strengths and weaknesses must be presented to help answer these questions. When placement into a vocational program is considered a vocational evaluation of the student is conducted and this information is also presented.

In order to help provide information for the IEP committee and instructors, the Mobile County Public School System in Mobile, Alabama, offers vocational evaluation to all special needs students. T.L Faulkner Area Vocational School (Faulkner) houses a Special Needs Vocational Evaluation Center (Evaluation Center). This center offers many services to the vocational instructor, some directly and other indirectly, with most of the services being derived from vocational evaluation data.

## Purpose and Objectives

What services are most useful to a vocational instructor for working with a special education student? Determining the answer to this question is the purpose of this research project.

Objectives are used in this study to state the research problem. Borg and Gall (1979) state that when a researcher is unable to predict the results of a study, objectives may be used instead of stating a hypotheses. By using objectives, it is hoped that tentative hypotheses will be generated which will be useful in future research.

The research objectives for this report are:

1. To determine the relative usefulness of services provided

by the Special Needs Vocational Evaluation component.

2. To generate hypotheses for further research in vocational education of special education students.

## Methodology

Prior to the interview of vocational instructors, the areas of assistance provided by the Evaluation Center were identified and isolated by type of services. These services were listed individually on index cards, forming a packet of cards, used in the formal interview.

### Subjects

Vocational instructors, who have vocationally evaluated special education students enrolled in their programs, were the subjects of the formal interview. These instructors were identified by comparing their class rolls with student rolls from the Evaluation Center.

### Format

A personal interview was conducted with each identified vocational instructor to explain the purpose of this study and to obtain data to meet the state objectives. An interview format was selected for collecting information for this study because it provides a one-to-one personal contact between interviewer and interviewee. Research indicates (Borg & Gall, 1979) that the interviews format will provide better response than a questionnaire format. Interviewees also have the opportunity to ask for an explanation of a question before responding and/or to give a more in-depth response to the question.

During the interview, the cards listing services were shown to the interviewee. He/she was asked to order the service cards by ranking those most useful to their working situation with special education students. Cards were ranked with the service felt most useful by the interviewee placed first on the left progressing ordinally with the least useful service to the right. Standardized instructions for the rank ordering of these cards were given to all interviewees.

The rank order procedure for analyzing data collected was selected because this procedure works well when the number of items to be ranked is less than 25 (Fox, 1979). Responses of the extremes will show strengths and weaknesses of services as the interviewee perceives them. Services were then tallied by rank positions from each interview to show an overall ranking order.

This composite tally illustrates which services have the most and the least usefulness to the subjects. A determination can now be made as to how services can be added or improved to meet each subject's needs.

## Results

There were nine vocational instructors from a staff of fourteen who met the requirements for this study. All nine vocational instructors were interviewed. All of the interviewees were told that the purpose of the interview was to obtain their input on the usefulness of Evaluation Center Services. All of the interviewees stated that they understood the rank ordering procedure and each interview was conducted without any problems.

### Delimitations

A delimitation for this study was that only one vocational school was used. Faulkner was the only area vocational school in Mobile County Public School System that had an operating special needs vocational evaluation center.

The composite tally of each interviewee's response to those services from the Evaluation Center felt to be most useful and least useful to their situation for working with special education students is shown in Figure 1. Individual interviewee responses and their identity were handled in a confidential manner. Figure 1 shows how each interviewee rank order each service, but it is difficult to determine clustering of responses for those services felt most useful and least useful by the interviewee.

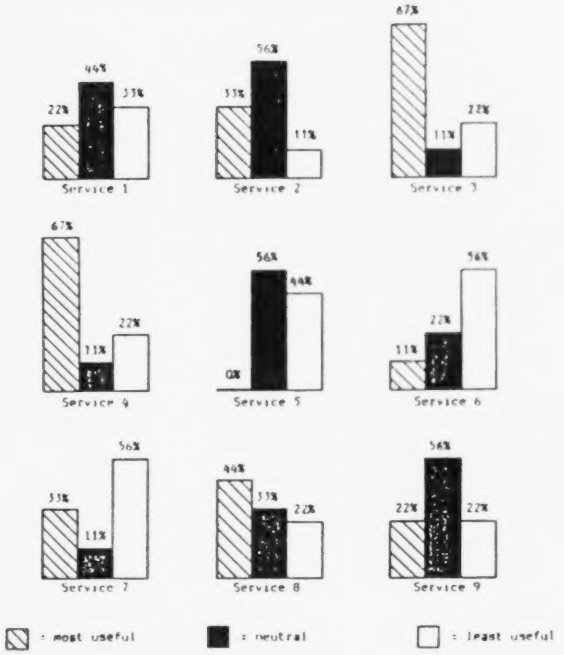
Figure 1

Composite Tally of Interviewee Reponses

| Services | Interviewees | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G | H | I |
| Liaison for vocational instructor | 5 | 3 | 4 | 7 | 8 | 5 | 5 | 7 | 2 |
| Course modifications | 3 | 9 | 5 | 1 | 6 | 4 | 4 | 3 | 5 |
| Placement recommendations | 8 | 2 | 1 | 4 | 9 | 2 | 2 | 2 | 1 |
| Assistance with vocational IEP development | 6 | 1 | 7 | 3 | 2 | 1 | 7 | 1 | 3 |
| Assistance with paperwork | 4 | 4 | 8 | 9 | 4 | 6 | 8 | 6 | 9 |
| Representation of vocational instructor at IEP meeting | 9 | 7 | 9 | 5 | 3 | 7 | 9 | 4 | 8 |
| Special Needs Vocational Evaluator as resource | 7 | 6 | 3 | 8 | 1 | 9 | 1 | 9 | 7 |
| Curriculum modifications | 2 | 8 | 2 | 2 | 5 | 8 | 3 | 5 | 6 |
| Resource materials | 1 | 5 | 6 | 6 | 7 | 3 | 6 | 8 | 4 |

Figure 2

Interviewee Responses Shown as Percentages



Rank-ordered response for each question were then grouped into cells and compressed into three categories: (a) most useful (rank order positions 1 through 3), (b) neutral (rank order positions 4 through 6), and (c) least useful (rank order positions 7 through 9). Figure 2 shows the interviewee responses as percentages in each category for each Evaluation Center service rank ordered by the interviewees.

Most services had some value to individual interviewees. Looking at Figure 2, services three and four have the highest percentage of being rank ordered most useful to the interviewees; "placement recommendations and vocational IEP development, respectively." Those services with a high percentage of being rank ordered as least useful were services six and seven; "representation at IEP meeting and evaluator as a resource, respectively."

## Discussion and Implications for Future Research

Objective 1 for this study was achieved. The relative usefulness of each service provided by the Evaluation Center, as derived from vocational evaluation data, was determined. All services had some degree of usefulness, either positive or negative, to the individual vocational instructors in this study. While two of the services were ranked high in the survey as being most useful, other services may have been perceived as being equally useful, but the interviewees were forced into a choice.

A follow-up with the vocational instructors who participated in this study would ascertain all of the services felt to be useful to them individually. Future efforts of the Evaluation Center should be directed to providing those particular services felt to be most useful to those individual vocational instructors to assist them in working with special education students.

Objective 2 for this study was achieved. Hypotheses for further research can be developed from this study. Possible problem statements which could be used to generate hypotheses are:

1. How do other vocational instructors in similar settings feel about the usefulness of services provided by a special needs vocational evaluation center?
2. Can other services be provided by the Evaluation Center that would assist Vocational instructors in teaching special education students?

## Summary

This research project addresses services derived from vocational evaluation and how useful they were to vocational instructors when working with special education students. Vocational instructors identified as the population for this study were formally interviewed.

First, services available to them from vocational evaluation data was listed on a pack of cards. During the interview, the vocational instructor was asked to rank order these services as to their usefulness for working with special education students in a vocational setting.

A composite tally of the services as they were rank ordered by the interviewees showed how useful services were perceived. From this information, services to vocational instructors that are derived from vocational evaluations can be modified or improved to better assist the vocational instructor in working with special education students.

The timeliness of the topic of this study is in concert with the current interest in vocational education nationwide. Part of the federal monies sent to state education departments, monies for both special education and vocational education, are used as set-aside funds for the special needs population within each state. This study shows that not only are the traditional interpretations of vocational evaluation data useful to the instruction of special education students mainstreamed into vocational education programs, but that vocational evaluation data can be interpreted to provide many and varying services to personnel involved in vocational education of these students.

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# INTRODUCTION TO MICROCOMPUTERS

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**ABSTRACT:** It has become impossible to pick up any periodical, newspaper, or professional literature without reading about the microcomputer revolution and it's coming effects on our personal and professional lives. Microcomputers have been called the fuel of the information age and the pencil of the eighties. From most accounts, it sounds as if through the simple pushing of a few buttons, anything we care to do is magically done for us by the microcomputer. Unfortunately, the reality of microcomputer usage is not that simple. While microcomputers are nothing more than electronic machines that are not difficult to understand, much of their actual use is clouded in mystique and jargon, Therefore, the aim of this paper is to provide an explanation of the components, terms, and usage of these marvelous machines to cast you off into the computer revolution.

While the advent of the computer could be traced to the ancient abacus, the first computer was built after World War II by Army engineers intent on discovering a quick method of computing the trajectory of missles. Their first computer utilized vacuum tubes, occupied two entire floors of a building and employed several people to constantly change tubes which blew out on an average of once every four seconds. With all it's size, that first computer had less capacity than most of today's microcomputers. The development of the microcomputer can be taken back to the mid 1960's with the formation of the Amateur Computing Society whose goal was to place computers in the hands of the general public. This was closely followed in the late sixties with the development by the Intel Corporation of the first microprocessor which moved computing circuits onto a small chip. This was followed by the first computer kit in 1971 and the first available microcomputer system in the mid seventies.

There are currently four types of computers available which all work in the same manner, however they are classified by their size. Most people are familiar with the mainframe computers which generally take up a large part of specially controlled room and have the capacity to handle many tasks at the same time (multitasking) and can handle a great number of users at the same time (multiuser). It is not unusual for a mainframe computer to have over 200 terminals hooked to it at remote sites and be working on thousands of operations. With a larger capacity are super computers which are used for gigantic number crunching problems as might be encountered in the space program. These supercomputers deal with billions of bits of data so rapidly that they take a mainframe computer to input and output the data. One step down from the mainframe is a minicomputer which has multitasking and multiuser capability however, they are generally set up for less than 20 input terminals. At the smallest end of the scale are micro, alias home or personal computers which are typically set up to service a single user and perform fewer calculations in a slower manner than the previous types. As computer size continues to shrink and capacity continues to increase, these divisions become increasingly diffuse to the point where it is expected that future computers may be as small as calculators and have the capacity of today's supercomputers. One other artificial division among computers is the dedicated computer or microprocessor which is utilized to do only a few functions and the non-dedicated computer which can be programmed to do any function capable by a computer. A machine which only performs word processing is an example of a dedicated computer while a personal computer capable of playing games, working math, or doing word processing is an example of a non-dedicated computer.

### How Computers Work

Computers are electronic machines which can only recognize electronic signals or current which is on or off. Thus, all information dealt with by the computer comes into the machine in a series of "on and offs", which can also be conceptualized plus and minus or 1 for on and 0 for off. Since such an elemental process is being dealt with by the computer, computer programmers utilize a system to communicate with the computer which exclusively uses the 1 for on and 0 for off concept, known as the binary or base 2 system or arithmetic. In the decimal or base 10 system with which most of us are familiar, each successive number from the right represents ten times the number. Therefore, in the number 256, the six is in the units place and stands for six times one, or six; the five is in the tens place and stands for five times 10 or 50; and the two is in the hundreds place and stands for two times 100 or 200. The number then becomes two hundred fifty six as it is represented in the decimal or base 10 system. In binary code or base 2, the first digit on the right stands for one, the second stands for two, the third for four, the fourth for eight, the fifth for sixteen, and so forth, so that each succeeding digit to the left represents double the amount of the last digit. Rather than being represented by digits 0 through 9 as is done in decimal, binary only uses 1 for on and 0 for off.

A binary representation of the decimal number 6 would be 1 1 0 where the rightmost digit is off meaning it is not counted, the second digit which stands for two is on and the third digit which stands for four is on. You can then add the third and fourth digit to get the total of the number. Another example may help. The binary number 1 1 1 0 0 1 1 1 is the equivalent of the decimal number 231. To convert it, start with the right most digit and add one because it is "on". The second digit to the right represents 2 which is added to the 1. The third digit represents four which is added. The fourth digit represents 8 but it is not added since it is 0 or "off". While this seems a cumbersome system to utilize, it actually uses fewer digits to represent large numbers than the decimal system to which we are accustomed and it places numbers in a form the computer readily understands. Although any number of digits can be utilized in the binary system, Computers are usually organized around multiples of eight digits. Each digit is called a "bit" and a set number of bits, often eight, makes up one number which is called a byte. Everything inputted to the computer is done so in binary form often utilizing eight bit bytes. Therefore, every key on the keyboard (which is similar to a standard typewriter keyboard) is represented in the computer by a byte, which is most often an eight bit binary number. There is a standard number system conversion named American Standard Code for Information Exchange, or ASCII for short, which provides the same internal numbering system representation of the keyboard for microcomputers utilizing this code and makes it possible for them to talk to one another. Therefore, in ASCII code which most microcomputers utilize, when you type a lowercase letter "a", that letter is converted to the number 97 and enters the computer in the binary code 01100001 which stands for "a" and is one byte. As you can see, it does not take long to stack up quite a few 1's and 0's in the computer memory. However, most microcomputers have at least 48,000 bytes of working memory and can handle lots of 1's and 0's, or bits.

What, you may ask, does the computer do with all those bytes? Basically, it stores them in it's memory or manipulates them in it's registers. Imagine a postman standing in front of a hugh group of pigeonhole boxes numbered one at the top left to 1024 at the bottom right. As a byte or character comes to the postman, he places it in the topmost available pigeonhole and he remembers both what is in each hole and what the address is of each hole. After receiving all his data, instructions come to the postman to do things with the bytes stored at certain addresses. For example, he may be instructed to double the number in hole 200, add it to the number in 215 and store the result in 1021. That is exactly what a computer does. As you can see, the more pigeonholes available results in more which can be stored. 1024 of these bytes makes up a Kilobyte or K for short and the more K's of working memory available provides increasing capacity to store and process information. Microcomputers often come with at least 48 or 64 K storage and can often be expanded to 640 K or more. As software programs become more sophisticated, they require increasing amounts of memory so that often in this case, more is better. Computer memory is of two types, Random Access Memory (RAM) or Read Only Memory (ROM). RAM is memory which is lost each time the machine is turned off and to which the user can read or write. ROM is memory which can only be read by the user and which usually remains in the machine after it is turned off. RAM is often the memory for the user while Rom is often the memory utilized by the machine to make a program run. Now that you understand the workings of a computer, it might be helpful to know the hardware.

## Hardware

All the storage memory, addresses, bits and bytes, registers, and other assorted things mentioned so far occur in the center of the computer known as the Central Processing Unit (CPU) which is where the action occurs. In order for information to get around in the computer it must be input with some device and it eventually is output to some device for the user to make sense out of the manipulations. During this process, the bytes travel along a common route which connects all the various parts known as the BUS. Theoretically, the fastest the information can move through the computer is the speed of light however, it moves much slower in actuality due to the resistance of the materials used in the circuits which causes some heat build up in the computer.

The most common way to input information is the use of a keyboard which can range from a standard typewriter-like keyboard to a large board filled with special function keys. Input can be accomplished by any device or means which can convert energy to numbers. Therefore, common devices include joysticks, bar code readers, light pens, touch tablets, digitizing cameras, switches, scanners, eye tracking mechanisms, air puff recorders, and even sensors which read brain waves. Since the introduction of IBM's MacIntosh, a device called a mouse has become popular. It utilizes a light or mechanical ball which can be moved on a surface and control a corresponding cursor on the computer monitor. With an ingenious placing of menus on pull down windows on the screen, the mouse can be a quick method to indicate instructions and it probably is at its best as a pencil control to do computer graphics. Computers can also be activated through voice recognition; however this technology is in it's infancy, and we are likely to encounter a great many other methods of inputting data in the next few years, particularly novel methods which can be used by the disabled and those of us rusty in our typing skills.

To output from the CPU, the computer sends it's binary output electrical signals, which can be read by another computer through the use of a modem, that is most commonly displayed on a monitor or printer. Monitors differ from a regular television in that they contain many more dots of light, or pixels and give much better resolution. For working frequently with numbers and letters, it is recommended that a monochrome monitor, usually available in phosphorus green or amber, be utilized while a color monitor is must used with graphic displays. The other most common output is to a printer. Of the printers, three types have become most popular. The dot matrix printer contains an impact device behind a ribbon which has a number of dots which can be impacted on the paper to form characters. The results look like the printing on a cash register tape and while legible, are not considered letter quality. Dot matrix printers offer the advantages of speed (measured in characters per second CPS), the ability to do graphics, and low cost. Another type of impact printer utilizes the typing letters on a wheel resembling a daisy and provide a letter quality print. These are often used in office settings and offer the advantage of appearance but cost more and are slower. Lastly, the ink jet printers have gained in popularity as their price has dropped due to their advantage in quality of print and speed. Other possibilities are: laser printers which use a laser to print on a drum and produce and entire page at a time in a process similar to a copying machine but have been expensive; a printer using heat sensitive paper which is cheap but produces inferior results; a plotter which can produce graphics in color; and combinations and expansions of the above.

Two other forms of output popular particularly in blind rehabilitation are braille tape and speech synthesizers which do a remarkably good job of speaking the output. If you are purchasing any of these input or output devices, keep in mind that they need to have a way to interface or hook up with the CPU. Many microcomputers require the additional purchase of an interface card in the $50 - $2000 range in order to make the input/output or peripheral devices work.

At this point, you understand how a computer works in it's CPU, and how to get information into and out of it's working memory. It would however, get old to have to start over with every program you wanted to work on after each time you turned the machine off and cleared the memory. For the purpose of saving data or storing it on a more permanent basis, a disk is used. There are several types of disks with the most popular being floppy disk in the 5 1/4 inch size. A floppy disk is a circular iron coated plastic disk inside a square plastic protective sleeve. It is used like a record in that it is inserted in a disk drive which has a hub in the center which turns the disk and a read/write head which reads the disk much like a record player tone arm. To use a floppy disk, you slip it in the drive with the label on the top and to the back, close the door to the drive and turn on, or reset the computer which will cause the disk to be started and read (called booted). In looking at the disk, you can notice a shiny oblong slot in the jacket which exposes the inner disk. That is the area read by the read/write head and should not be touched as the slightest bit of oil from your hands or smallest particles of debris such as a cigarette ash which can interfere or clog up the read/write head. While the workings of a disk is similar in appearance to a record, it is most like a magnetic tape which is exactly how information is stored and retrieved. Thus, you can write on a disk and erase a disk just the same as you do an audio tape. Also like an audio tape, a floppy disk has a notch cut into the right side at the tip which allows you to write on the disk. If you do not want the disk written on as may be the case in a program disk, you simply cover the notch and the disk can subsequently only be read. Disks vary in price and quality and in the available usage of a single side or both sides and in the density. Therefore, you need to know before buying a disk which kind your machine requires.

In addition to the 5 1/4 inch floppy disk, you can buy disk drives for an 8 inch disk which holds more information and the newer 3 1/2 inch disk which surprisingly holds as much as the 5 1/4 inch. They all work the same however. Your computer will require that you prepare the disk before use. In the operation, a disk is divided into sectors of information. The computer reads concentric circles or tracks of data from the disk and it additionally will sector the tracks into pie shaped sectors of a fixed number of bytes each. Since each machine sectors differently, disks prepared for one brand of machine will not run on another brand unless it is made to be compatible.

When purchasing a disk drive, it is advantageous to utilize a disk which will hold as much information as possible. Therefore, a double sided disk or one which compacts the sectors to hold more bytes is preferred. It is also desirable to have two disk drives as a number of programs require two or make it more convenient to use two. It is difficult in this area to make definitive statements however, as this technology is improving weekly. Once you use floppy drives for a short time, you become aware of their major disadvantage. That is, if you have a large program to be read into RAM, it takes a few minutes and you quickly become tired of waiting on the machine and/or of filling up floppies. One solution to those problems is to purchase a hard disk drive. They work in the same manner as the floppy disk except the disk is rigid allowing it to hold much more information, on the order of 10 to 100 million bytes as opposed to 100 to 400,000 on the floppy, and reading and writing is instantaneous. Generally, they are enclosed in the machine which makes it less likely to have your data destroyed, however the drive unit is more expensive than a floppy drive unit. This concludes the usual types of hardware which may be desired and leads us to an examination of the software which contains the operating system, languages, and commercial programs.

## Software

In order to have the CPU know how to accept, keep up, and output data, it needs instructions. While this can and is partially or wholly placed in ROM, some part of those instructions or all of them are contained in an operating system which is programmed for a particular machine and usually comes on a floppy disk. These instructions are know as the Disk Operating System or DOS and usually are included with the cost of purchasing a machine. However, they are updated frequently to add different commands or expand the range of what your machine can do and you are expected to keep up and purchase the updates if you desire them. Also, on some machines several companies make different special purpose operating systems or you will find that some other DOS than the one you were supplied with has gained in popularity. Regardless, your first task as a new user will be to learn the operating system with which you are working. Commercial programs are written more for an operating system than for a particular brand of machine so that even those will require you to be familiar with your DOS. Once you have gained that familiarity, you should be able to issues commands to your computer which will make it perform it's functions. As you might expect, operating systems differ among different brands of microcomputers which will prevent you from using one piece of software on different machines unless they use the same DOS. One type of DOS called CP/M has tried to become universal and has met with some success but still is not a universal system.

Most individuals are interested in using a microcomputer and are less interested in programming one as programming takes a great deal of skill and time. To use a computer requires only that you understand your computer's DOS and purchase i.e., already programmed, program on a compatible disk which you can quickly learn to use. For example, for any microcomputer you can purchase word processing or financial management or data management programs which you can learn to operate. These range in complexity and cost and are regularly reviewed in popular computer magazines. It is easy and fun to keep up with various types of programs and many people enjoy being the first kid in their block to obtain a copy of the hottest, newest thing.

If you are not pleased with the commercially available programs for your purpose, or if you find the urge to sit in front of a monitor for endless hours is irresistible, then you may want to explore the next level of computer usage through programming. With programming, you write the code to make the computer do what you want - the glory of ultimate control. While you might discover that you can do a better job of designing a program for your needs, prepare yourself to spend a great deal of time. One of the rewards of such an effort however is to make something which works and in some cases to sell something which you have created. Programming requires the understanding of a computer language which can be learned in self-instructional books or in continuing education or university courses. Languages range from those which are closest to the binary computer talk called low level, such as machine or assemble language to languages which are most similar to english (high level) such as basic. The low level languages often provide much greater speed of operation and can be more complex to learn while the high level languages are simpler to start out on but slower. Most people start with Basic and may move on to more complex languages if they like programming. Other popular languages include Fortran, Cobal, APL, Forth, and C. Some of these are special purpose and are more applicable to different situations. It is not unusual for a novice to be unsure of what a computer can do to be of assistance to them and at times it appears that it might be faster and easier to do things by hand than to invest in a computer. If checkbook balancing and recipe storage are the only requirements of a user, then a computer does not make sense, however there are some things the computer does better, particularly if they are operations that are often repeated.

## What Computers Do Well

Microcomputers can be used for many purposes however, they do the following five things extremely well: 1) They can store high amounts of information; 2) They can quickly search and retrieve stored information; 3) They compare information quickly; 4) They manipulate graphic symbols; and, 5) They rapidly perform mathematical functions. For human service workers, the ability of computers to deal with information in the first three areas have proven valuable. For example, many office workers deal with words, files, and information which are tailor made to be computerized to make dealing with those faster and simpler. In vocational rehabilitation for example, it is fascinating to be able to compare a worker's aptitude and ability profile with every other job in the Dictionary of Occupational Titles in a matter of a few minutes. Such a process done by hand used to take days. It is equally intriguing to be able to move paragraphs within a typed document around in seconds or make editorial changes and have documents retyped in minutes instead of hours. For you to discover what a computer can do for you, it is recommended that you get one and get started. You will find more and more reasons to justify it after you begin.

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# COMPUTER SOFTWARE FOR ASSESSING AND SHAPING MOTOR PERFORMANCE IN VOCATIONAL EVALUATION AND ADJUSTMENT PROGRAMS

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**ABSTRACT:** This paper presentation demonstrated the Research and Training Center's "Learning Curve Analyzer" software developed by Dr. Thomas Blakemore and Dr. Charles C. Coker. The software has been used in research and in clinical settings, and continues to be refined through research and development.

## Introduction

One of the processes in Vocational Evaluation is the administration of work samples to assess the ability of an individual to perform a specific task or similar tasks. Work samples normally represent the actual tasks that the individual is expected to do on the job. Interpretation of performance would appear to be a simple yes-no dichotomous decision, based on the face validity of the work sample and comparison of task performance to an appropriate norm. There are three potential fundamental errors in drawing conclusions from this simple comparison to normative criteria.

First, the norms (industrial standards, method-time-motions (MTM) measures, or locally developed client norms) to which the client's performance measures are compared are based on individuals whose amount of prior training or experience on the task(s) typically far exceeds that of the client. The usual result is an underestimation of the skill level of the client. Industrial and MTM measures are norms for practiced workers or the well-practiced motions of practiced workers, while client norms yield performance norms based on individuals with an unknown amount of practice on the task or motions. The most important point of this criticism is not so much what the normative criteria should be, but how to measure the amount of prior training or practice the client has had, so that practiced performance levels are compared to similar practiced performance levels. It has been shown by Dunn (1976), Chyatee (1976), and Blakemore and Coker (1982) that traditional work sample administration procedures involving industrial standards or MTM will seriously underestimate a client's ability. Client norms may vary in terms of over- or underestimation of the client's ability.

Secondly, traditional work sample administration loses valuable data that could better determine the client's real potential. Clients with the same performance level on a work sample may not have the same potential. One client may have started out slow, but steadily acquired higher skill levels over repetition of the tasks in the work sample. Another may have performed at a steady pace over all repetitions. Obviously, the problem is to determine if learning has been completed or not, and whether any significant increases in performance could be expected. Traditional work sample administration fails to examine performance on each repetition of the tasks within a work sample.

Third, work samples may not be used just to measure current functional ability, but also as predictive measures of an individual's future potential. Work sample theory does not include valid criteria for prediction of future skill level performance. Instead, work samples are just that, and the appropriate conclusion is whether the individual can now perform those tasks assessed. When used in a predictive mode, work samples become psychometric measures and are subject to some questions of reliability and validity as those measures which they were once taunted to replace.

There is a technique which addresses the three fundamental errors of traditional work sample assessment. This technique involves the measurement of performance changes over several repeated trials on a task and uses statistical measures to predict the "learning curve" of the individual. Recommendations would be more concerned with how long it would take to reach criteria, rather than judging the presence of absence of the skill. The use of learning curve analysis could be a valuable tool in the vocational evaluator's repertoire.

Such a recommendation is not new and has long been advocated (Tillman, 1971; Dunn, 1976; and Blakemore and Coker, 1982.), but very few have utilized learning curves to estimate whether the measured performance is nearer to the tip or bottom of their learning curve. The application of learning curve techniques has not grown simply because they have been too time consuming and cumbersome to apply. With the recent availability of low cost, yet high powered microcomputers, the techniques of learning curve analysis could be used rather easily in Vocational Evaluation and Adjustment programs, at least for repetitive motor tasks.

It is for these fundamental errors of traditional work sample administration that the microcomputer software was developed. The program does a number of things, such as gather data, store data, compute learning curves, present simple and complex feedback and pacing stimuli, and provide a hard copy of the performance information and task conditions. The primary function, however, is to give evaluators and adjustment specialists with a tool to increase their effectiveness in assessing and changing task performance. One of the most prominent aspects of vocational evaluation is the administration of work samples. After a client has been assessed using work samples, their performance is compared to some norm to determine how well they performed a task relative to other individuals. There is a widespread belief among many vocational evaluators and consumers of these services that competitive norms or industrial norms are the best basis for judging client performance on a work sample (Larsen & Curtin, 1973). In fact, the Commission on Accreditation of Rehabilitation Facilities regulations state that ". . . if work samples are used, competitive norms or industrial standards shall be established and used." (CARF, 1982). There are three ways in which competitive norms can be established: (1) by using the performance of a group of workers employed in a particular occupation; (2) by using a predetermined motion-time system, such as MTM or MODAPTS; or (3) by using piece rates established by a time-study, if the work sample is taken directly from an industrial setting. With all of these methods of calculating norms, the individuals upon whom the norms are based tend to have experience and considerable practice with the tasks included in the work sample. The workers whose performance is used to establish competitive norms and those represented in time studies have obviously had experience performing the task. Similarly, the workers upon whom predetermined motion-time studies are computed are also experienced at the task (Schwab, 1963). Another normative criterion is the development of local client norms. In this case the amount of previous experience on the task is unknown.

There are a large number of studies demonstrating that performance on work tasks involving motor skills shows marked improvement with practice (e.g., Fitts & Posner, 1967; Schmidt, 1975). In addition, further research demonstrates that improvement continues to occur for many thousands (Cochran, 1968) and, in some cases, even millions (Crossman, 1959) of practice trials. The basic conclusion to be reached from studies of motor and industrial work skills, is that these generally show progressive improvement with practice over a large number of trials and, perhaps, many years (Peterson, 1975).

These findings cast doubt upon the validity of competitive norms and industrial standards with simulated work tasks. Competitive norms (such as those derived from a group of employed workers in an occupation) and industrial standards (such as those derived from a pre-determined motion-time study system such as MTM) reflect the performance of experienced workers: those who have had Vocational Evaluation programs, however, tend to be inexperienced workers: they have had only limited work histories and are unemployed at the time they are receiving services (Dunn, 1975). Comparing the performance of an inexperienced persons to norms and standards developed from the performance of experienced persons tends to underestimate the functioning level of the inexperienced person (i.e., that level at which the inexperienced person would perform if provided with practice equivalent to that possessed by the experienced person). In other words, when competitive norms and industrial standards are used with work task time scores, and provision is not made for the individuals to have practice equivalent to that enjoyed by the norm or standardization group, the result is underestimation of the client's potential performance level. If this underestimation occurs early in the Vocational Evaluation process, the result would be to exclude broad occupational areas from further consideration for the client. Error later in the process would tend to exclude specific occupational areas and/or jobs.

The ability of people (both disabled and nondisabled) to reach an industrial standard criterion within a single administration of a simulated task appears to be quite limited. Research by Dunn (1976) suggests that the ability of nondisabled persons to reach the 100% of standard level in a single administration of a work sample appears to be similarly limited. In this study, normative criteria were applied to the work sample performance of 54 college undergraduates and found that only 15% of the males and 6% of the females reached the industrial standard during the first administration (50 trials). When provided with an additional three administrations (150 trials) or practice, however, 55% of the males and 42% of the females met the industrial standard. Individualized prediction equations, based on the times for the four administrations, were developed and used to predict practiced ("peak") levels of performance for these subjects. Those predictions indicated that, after 20 administrations of the work sample, 70% of the males would have attained the industrial standard, while 70% of the females would have attained the standard after 25 administrations. In other words, these data suggest that about 20 administrations for males and 25 administrations for females would be required to clearly differentiate those individuals who could readily attain the industrial standard from those who could not. Thus, in the traditional approach to Vocational Evaluation utilizing one administration, 55% of the males and 71% of the females would have been misclassified in Dunn's study.

Research conducted at Emory University Research and Training Center (Chyatte 1976) provided a client time score distribution and industrial standards based on MTM-3 for two JEVS work samples; union clients who took the union assembly and 1.2% of those who took hardware assembly reached 100% of the industrial standard with one administration of the work sample. Results of research by Blakemore and Coker (1982) were similar to those found by Chyatte. On the first administration of the Stout-Eye-Hand-Foot Coordination work sample only 5% of the clients performed well enough to exceed the industrial standard for the task. However, after four additional administrations of the work sample, 55% of the clients exceeding the industrial standard and individualized prediction equations indicated that most of the remaining clients could have eventually exceeded the industrial norm.

## Learning Curves: A Potential Solution

A number of researchers (e.g., Tillman, 1971; Dunn, 1976; Blakemore and Coker, 1982) have suggested that one way to overcome the problems of underestimating client potential on work samples is to plot the client's performance data in the form of a learning curve (or equation) and to extrapolate client potential using this data. For instance, Tillman suggested that the client's performance on a task should be graphed with the number of practice trials on the horizontal axis and some measure of performance, such as production rate, on the vertical axis. Such graphic representations, called learning or performance curves, typically show increases in performance with increases in practice. The law of diminishing returns sets in on such tasks, however. That is, the slope of the curve, which represents the rate of learning or improvement, is usually very steep on the initial practice trials but tends to level off as the amount of practice increases. Tillman suggested that clients should be allowed to practice a work sample until their performance curve becomes almost horizontal, that is, until performance is no longer improving and that this level of performance would be used to gauge client potential. As mentioned above, however, improvement can continue for many thousands and even millions of trials. For this reason, Dunn (1976) has suggested that Tillman's technique might require an exorbitant amount of practice before performance levels off. Dunn proposed, instead, that the data on the performance of a limited number of trials could be fitted to a regression (or learning curve) equation and that this method could be used to accurately predict client potential.

The term "learning curve" usually refers to a graph representing changes in performance over time or trials. Though the changes in performance can be attributed, in part, to learning, variations in the curve also reflect variables other than learning which affect performance (e.g., environmental variables, motivation). Though these graphs of performance do not necessarily reflect the actual amount of learning that occurs, they do reflect how an individual actually performs, which is the most important aspect. Since the term learning curve is widely used in literature this study referred to the graphing of performance (and equations which describe such performance) as a learning curve, with the realization that such curves reflect the effects of many variables.

The research by Blakemore and Coker (1982) also indicated that the use of the learning curve technique does have great potential for providing accurate estimates of the level of performance that someone can attain at a task following practice. Blakemore and Coker had Vocational Evaluation clients perform on the same work sample for five consecutive work days. On the average, performance was 30.68% better on the final day of practice (Day 5) than on the first day of practice (Day 1). Thus if the performance level (total time score or average score) for Day 1 had been used as the estimate of the client's capacity to perform this task, their potential would have been underestimated by an average of 30.68%. Blakemore and Coker's analysis demonstrated that learning curves could produce significantly more accurate predictions on Day 5 performance. They found that predicting Day 5 performance using the total performance scores from Days 1-4 produced predictions that differed from the obtained level of performance by only 6.78%, on the average. They also predicted that Day 5 performance level using only the time scores for the first 50 Repetitions of the task (Day 1) and found that these predictions differed from the obtained level of performance by 17.15%. Both of these estimates were significantly better than the 30.68% average error made when using the total time score for Day 1 to estimate Day 5 performance level. Thus Blakemore and Coker's results clearly indicate that learning curves can be used to produce significantly more accurate estimates of someone's capacity to perform a task than is typically obtained when the total time score for a single administration of work samples is used to estimate that capacity. The findings of the study by Dunn (1976) closely paralleled Blakemore and Coker's findings.

FIGURE 1:

Examples of differential performance during a work sample with the same normative score of 67%.

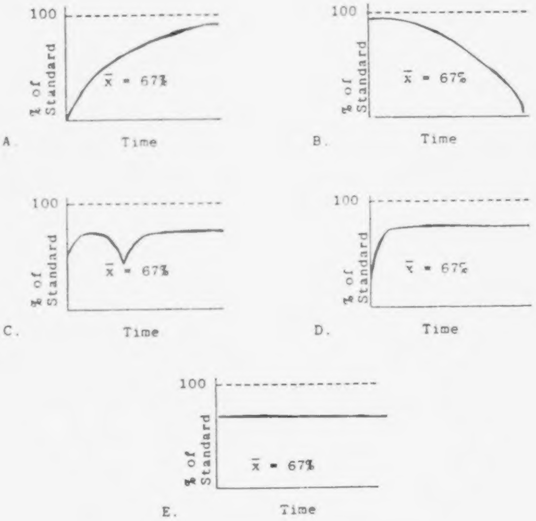
A. Normal acquisition under an idealized learning curve.

B. Decline in performance due to fatique or lack of motivation.

C. Acquisition and reacquisition due to temporarily forgetting tasks, disruption, lack of attention, etc.

D. Rapid reacquisition to steady state indicating the relearning of a previously mastered task.

E. Idealized practiced worker performance assumed under traditional work sample administration.



The advantage of the learning curve approach to evaluating work sample performance is that this method reflects what changes occur in the client's work sample performance during testing. A static process of evaluating the level of functioning, such as using the mean or total production rate, fails to account for differential performance during the repetitions of the tasks within the work sample and the potential for further learning. Individuals functioning at the same average level on a work sample involving several repetitions are not necessarily performing comparably during the entire session. Figure 1 illustrates this point. In Situation A, the idealized learning curve is presented where skill acquisition increase consistently over time. In Situation B, performance deteriorates over time rather than steady improvement. It is clear that the client initially performed well, but performance deteriorated; and may have been caused by fatigue, boredom, confusion, etc. In Situation C, performance is relatively stable except that there is a momentary decline in task performance due to distraction, forgetting of instruction, or perhaps lack of parts. In Situation D, there is a rapid requisition of the task. It is indicative of having had previously mastered the task and of the ability to rapidly return to that level. Finally, steady level task performance from first to last repetition is graphed as is assumed under traditional work sample administration. Only in Situation E is the true current and potential level of task performance of 67% of the normative criterion accurate. In the other situations, current and potential task performance is underestimated and additional valuable information about the client is lost. It would not be lost, however, if a learning curve analysis was used.

## The Microcomputer Solution to Learning Curve Analysis

The major drawback to the use of learning curve is the fact that the use of this approach could increase the work load of vocational evaluators beyond reason. In the traditional approach, the total number of pieces, the total time to complete a set number of pieces, or mean production rate are relatively simple to obtain. It is also very easy for evaluators to administer the work sample and obtain the data in such cases. A timer is started when the client begins the task and is stopped when the client is finished. In the interim, the evaluator can be busy with other tasks.

This would not be the case, however, if an evaluator were to collect data to be used in calculating a learning curve for a client. In this case, the evaluator would have to constantly monitor the client's performance, recording the amount of time taken to complete each item. Furthermore, the evaluator would then have a more complex analysis of the data to perform. This procedure would, of course, reduce the amount of time evaluators could spend on other aspects of their work or with other clients. Thus, though analysis of performance through generation of learning curves has been advocated for a number of years, few evaluators consistently employ them.

One of the primary purposes of the previous research project by Blakemore and Coker (1982) was the development of a microprocessing (microcomputer) system that automatically collects data on work sample performance and calculates a learning curve using the data which was collected. That device has the advantage for applied use of learning curves, in that it can be used to accurately reflect a client's present level of functioning and potential. At the same time, it does not have the disadvantage of increasing the work load for an evaluator. One purpose of this project involved determining the feasibility and utility of making the learning curve theory a routine procedure for evaluating client potential through the development and testing of software for microcomputers.

## Learning Curve Analysis Software

The software that was developed involved the use of three concepts: Learning curve analysis, performance feedback, and pacing of performance. For all three concepts, the recording of the time it takes for a client to complete each repetition of a task on a work sample is required. The computer provides the timer, but the task must include switch closure to start and stop the timer. The closure can be obtained by including pressing a switch as part of the task elements, or an element could start and stop the timer. In the latter case, a completed piece could be dropped into a box which closes the switch or breaks a photocell beam. There are a number of more creative and exotic ways that switch closure or opening could result in control of the timer that is part of the software program or computer. Once the task is appropriately tied to the computer, an evaluator or client can utilize the software.

The accompanying manual explains how the user can select and interact with the various programs. In Appendix A, selections within the Main Menu (M), Learning Curve Analyzer Program (L), Performance Enhancer Program (E), Feedback Menu (F), Pacer Menu (P), Data Analysis Program (D), and Learning Curve Analysis Menu (C) are given. The presentation demonstrated the operation of the various sub-routines of the software. In addition to these relatively well known learning theory techniques, the "vest 20% method" developed by the Research and Training Center (Blakemore and Coker, 1982) and the demonstration of confidence intervals or error of measurement associated with the learning curves were discussed.

The "Performance Analyzer and Performance Enhancer" software were developed as part of the objectives of the Research and Training Center grant awarded to the Stout Vocational Rehabilitation Institute by the National Institute of Handicapped Research, Officer of Special Education and Rehabilitation, Department of Education. Currently, this software is undergoing field testing in three different rehabilitation facilities and will be made available for use on the Commodore 64 computer with disk drive upon completion. The software may be made available for other computers. The Commodore, however, does provide a relatively sophisticated computer at a reasonable price. The Commodore was chosen to increase the likelihood of the purchase of a computer dedicated to applications within the rehabilitation services such as Vocational evaluation, work adjustment, skill training, and job placement.

## APPENDIX A

### Software Program Selections

### PERFORMANCE ANALYZER
### AND
### PERFORMANCE ENHANCER

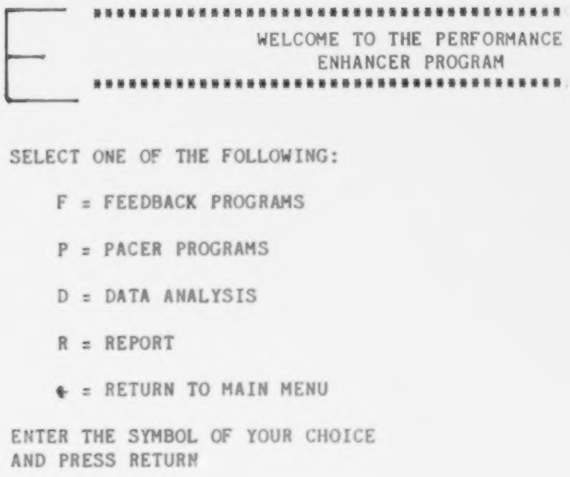
**Copyrighted Computer Program**

**Research and Training Center**
**University of Wisconsin-Stout**

```
M  ***********************************
            WELCOME TO THE MAIN MENU
   ***********************************

SELECT ONE OF THE FOLLOWING:

    L = LEARNING CURVE ANALYSIS

    E = PERFORMANCE ENHANCEMENT PROGRAM

    D = DATA ANALYSIS OF RECORDED DATA

    Q = QUIT

ENTER THE SYMBOL OF YOUR CHOICE
AND PRESS RETURN
```

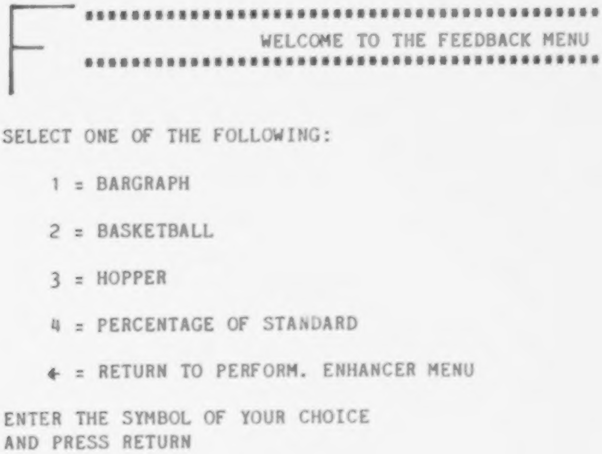
```
L  ****************************************
            WELCOME TO THE LEARNING CURVE
                   ANALYZER PROGRAM
   ****************************************

SELECT ONE OF THE FOLLOWING:

    C = DATA COLLECTION

    D = DATA ANALYSIS

    R = REPORT

    ← = RETURN TO MAIN MENU

ENTER THE SYMBOL OF YOUR CHOICE
AND PRESS RETURN
```

E



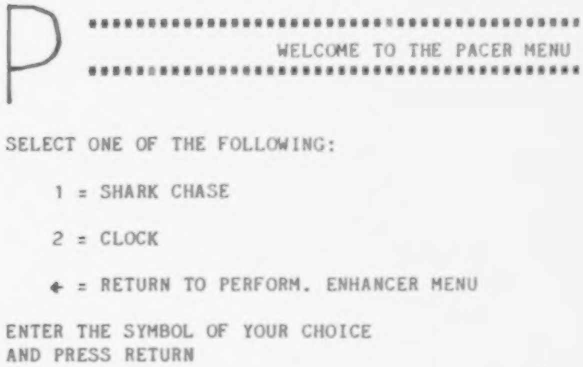
```
****************************************
                WELCOME TO THE PERFORMANCE
                     ENHANCER PROGRAM
****************************************

SELECT ONE OF THE FOLLOWING:

    F = FEEDBACK PROGRAMS

    P = PACER PROGRAMS

    D = DATA ANALYSIS

    R = REPORT

    ← = RETURN TO MAIN MENU

ENTER THE SYMBOL OF YOUR CHOICE
AND PRESS RETURN
```

F



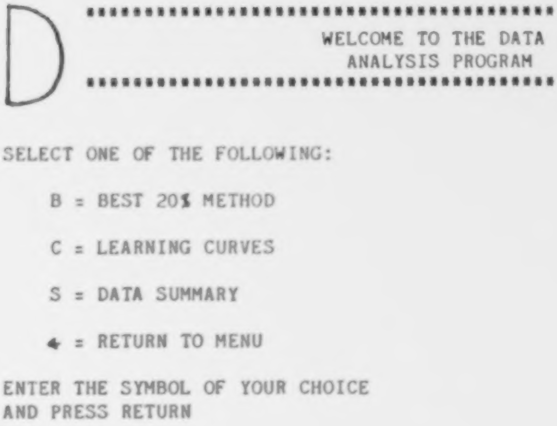
```
********************************************
              WELCOME TO THE FEEDBACK MENU
********************************************

SELECT ONE OF THE FOLLOWING:

    1 = BARGRAPH

    2 = BASKETBALL

    3 = HOPPER

    4 = PERCENTAGE OF STANDARD

    ← = RETURN TO PERFORM. ENHANCER MENU

ENTER THE SYMBOL OF YOUR CHOICE
AND PRESS RETURN
```

P



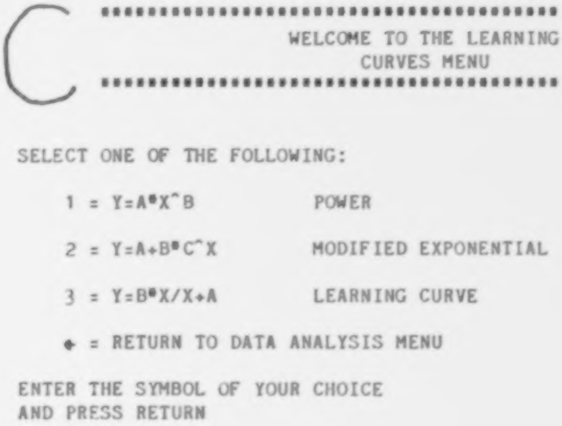
```
******************************************
                WELCOME TO THE PACER MENU
******************************************

SELECT ONE OF THE FOLLOWING:

    1 = SHARK CHASE

    2 = CLOCK

    ← = RETURN TO PERFORM. ENHANCER MENU

ENTER THE SYMBOL OF YOUR CHOICE
AND PRESS RETURN
```

D



```
****************************************
                   WELCOME TO THE DATA
                     ANALYSIS PROGRAM
****************************************

SELECT ONE OF THE FOLLOWING:

    B = BEST 20% METHOD

    C = LEARNING CURVES

    S = DATA SUMMARY

    ← = RETURN TO MENU

ENTER THE SYMBOL OF YOUR CHOICE
AND PRESS RETURN
```

C



```
***************************************
              WELCOME TO THE LEARNING
                    CURVES MENU
***************************************

SELECT ONE OF THE FOLLOWING:

    1 = Y=A*X^B          POWER

    2 = Y=A+B*C^X        MODIFIED EXPONENTIAL

    3 = Y=B*X/X+A        LEARNING CURVE

    ← = RETURN TO DATA ANALYSIS MENU

ENTER THE SYMBOL OF YOUR CHOICE
AND PRESS RETURN
```

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# NATIONAL SURVEY OF COMPUTER USE IN REHABILITATION FACILITIES

**PAUL M. McCRAY**
**THOMAS F. BLAKEMORE**

**ABSTRACT:** The Research and Training Center at the University of Wisconsin-Stout is one of 27 centers funded by the National Institute of Handicapped Research to conduct research on training related to improving the lives and well-being of people with handicaps. Each of the centers has a unique focus. The center at UW-Stout is one of the few which addresses issues related directly to vocational rehabilitation. The primary mission of our center is to conduct research and training designed to enhance the economic viability of rehabilitation facilities as well as improve the quality of services provided to people served by these organizations. This particular research project is concerned with both of these issues.

This project investigated a number of aspects of computer use in rehabilitation facilities. It consisted of a two-phase survey of approximately 4,000 rehabilitation facilities nationwide. The overall purpose of this project can be broken down into five distinct objectives which focused on identifying: (1) the current extent of computer use in rehabilitation facilities; (2) how they are being used in terms of administration, rehabilitation services, and production management; (3) what specific types of hardware and software configurations have been installed; (4) what trends are likely to affect the progress of computer use in facilities; and, (5) the feasibility of developing a national network of rehabilitation facility computer users. Only the results of the first phase of this project will be presented here.

## Method

### Sample

The target audience of this survey included all facilities which offer any (re)habilitation services to individuals with handicaps. Surveys were sent to 4181 facilities on the Research and Training Center's mailing list. The majority of these facilities would be considered sheltered workshops. Also included in the sample, however, were a number of schools, universities, and hospitals with rehabilitation programs.

The questionnaire was first mailed at the beginning of August, 1983 to all 4181 facilities on our mailing list. The questionnaire consisted of two parts. Part one addressed facilities already using computers in their operations. Part two addressed nonusers and was designed to assess the extent to which nonusers planned to integrate computers into their operations in the future. There were 962 completed surveys in response to the first mailing and 600 "dead letters" returned by the post office as undeliverable. Three months after the initial mailing, a second mailing was sent to all facilities for which a completed survey or dead letter notice had not been received. An additional 624 completed surveys were received from the second mailing, for a total response rate of 1586 returns. This represent 44% of the 3581 facilities which presumably received the questionnaire.

## Results and Discussion

The data consisted primarily of frequencies but also included brand names and models of computers, the purchase costs of computer equipment and software, the costs of operating computers, the number of clients and employees in facilities, and the annual operating budgets of those facilities. These data were coded and entered into a computer for analysis. The data analysis consisted of determining the frequency of responses to various questions and the use of crosstabulations, chi-square tests, and analysis of variance where appropriate to determine whether group differences were significant. The results are briefly discussed in the remaining portions of this paper. Space limitations prevent a thorough discussion of all of the results in this presentation, however, a final report on this project will be issued by the center and will be available to interested parties.

## Characteristics of Facilities Which Do or Do Not Use Computers

Of the 1586 facilities which responded to the survey, 864 (54%) are currently using computers, whereas 722 (46%) are not using them. Users may be timesharing, using a data processing bureau, or own or lease a computer(s). The percentage of users in this study (54%) was quite similar to Miller's (1981) findings which indicated that 51% of the estimated 2400 facilities he surveyed were using computers. However, as will be seen later, there is a notable difference between these two groups in terms of computer ownership.

The relevant data were examined to determine how Users and Nonusers differ. Table 1 Presents a summary.

TABLE 1

Summaries of Analyses of Variance Comparing Computer Users and Nonusers on Number of Clients Served Annually, Number of Employees, and Size of Annual Budget

| Source | Group Mean | df | Mean Squares | F | p |
|---|---|---|---|---|---|
| Number of Clients | | | | | |
| Between | | 1 | 110,641,551 | 27.71 | <.001 |
| Users | 1225 | | | | |
| Nonusers | 614 | | | | |
| Within | | 1205 | 3,992,838 | | |
| Number of Employees | | | | | |
| Between | | 1 | 3,121,645 | 79.23 | <.001 |
| Users | 154 | | | | |
| Nonusers | 51 | | | | |
| Within | | 1205 | 39,397 | | |
| Annual Budget | | | | | |
| Between | | 1 | 882,109,816 | 133.39 | <.001 |
| Users | $2,820,495 | | | | |
| Nonusers | $1,096,821 | | | | |
| Within | | 1205 | 6,613,013 | | |

TABLE 2

Percentages of Users and Nonusers Indicating That They Provide Specific Rehabilitation Services and the Results of Chi Square Tests Comparing the Groups

| Rehabilitation Service | % of Users | % of Nonusers | Chi Square | p |
|---|---|---|---|---|
| Vocational/Work Evaluation | 71 | 58 | 27.99 | <.001 |
| Psychological Testing | 57 | 30 | 10.83 | <.001 |
| Personal/Social Adjustment | 72 | 57 | 40.34 | <.001 |
| Work Adjustment Training | 70 | 58 | 26.79 | <.001 |
| Occupational Skill Training | 58 | 34 | 91.53 | <.001 |
| On-The-Job Training | 55 | 39 | 39.87 | <.001 |
| Job-Seeking-Skills Training | 64 | 49 | 34.99 | <.001 |
| Job Placement Services | 63 | 47 | 45.47 | <.001 |
| Sheltered Employment | 57 | 47 | 13.89 | <.001 |
| Work Activities | 63 | 54 | 13.57 | <.001 |
| Independent Living Training | 56 | 43 | 30.16 | <.001 |
| Daily Living Skills Training | 66 | 51 | 30.16 | <.001 |
| Recreation | 58 | 45 | 25.92 | <.001 |
| Medical Services | 46 | 25 | 79.92 | <.001 |
| Residential | 39 | 24 | 40.84 | <.001 |

It can be readily seen that Users generally represent larger facilities. A second set of analyses was calculated to determine whether Users and Nonusers differ in the types of services provided. Table 2 presents the percentages of each group which provide various services and the results of Chi Square (x2) tests that were performed on these data. As is evident, significantly more of the Users provide each of the services listed in the table than do Nonusers. The results of both of these analyses indicate, not surprisingly, that it is the larger and more comprehensive facilities which are currently using computers.

## Analyses of Facilities which Currently Use Computers

Table 3 presents the various percentages of how current computer users tend to utilize their systems. As is quite evident from the table, the heaviest use of computers at this time is for various administrative uses, primarily in the areas of accounting (70%) and bookkeeping (64%) and staff payroll (61%). The percentage of computer users involved in production and rehabilitation functions is considerably lower. The most heavily used production categories were: Recordkeeping/Reporting (31%); Inventory Control (26%); and Cost Control (22%). With regard to use in rehabilitation services, by far the greatest use was in the area of Assessment (25%), which includes both psychological and vocational.

## Types of Computers Used

Another set of analyses examined information related to the types of computers facilities currently used. The first of these examined the class of computer. The results are depicted in Table 4 below. In addition, 19% of the facilities which use computers stated that they use

TABLE 3

Current Computer Use in Administrative, Production, and Rehabilitation Services Applications

| ADMINISTRATIVE | | PRODUCTION | | REHABILITATION SERVICES | |
|---|---|---|---|---|---|
| Application | % | Application | % | Application | % |
| Accounting | 70%* | Production Control | 12% | Assessment (Vocational Evaluation, Psychological Testing, etc.) | 25% |
| Bookkeeping | 64% | Production Scheduling | 10% | Adjustment (Personal, Social, Work) | 13% |
| Word Processing | 50% | Inventory | 26% | Residential | 10% |
| Mailing Lists | 53% | Motion-Time Study | 6% | Independent Living Training | 9% |
| Spreadsheets (Business Projections) | 38% | Contract Bidding | 9% | Job Seeking Skill Training | 16% |
| Staff Payroll | 61% | Cost Control | 22% | Other | 11% |
| Client Payroll | 48% | Production Records/Reports | 31% | | |
| Program Evaluation | 34% | Other | 4% | | |
| Other | 21% | | | | |

* Percentage of current Users employing computers for this application.

timesharing and 38% use a service bureau arrangement. Perhaps of most notable importance, there appears to have been a dramatic increase in the number of facilities which own computers, particularly microcomputers, compared to two-and- one-half years ago when Miller (1981) conducted his survey.

Table 4

Comparison of Computer Use and Ownership in Facilities - 1981 versus 1983/1984

| Type of Use/Ownership | Miller's 1981 Findings | Current Findings 1983/84 |
|---|---|---|
| Facilities owning computer of any type (micros, minis, main frames) | 31% | 66% |
| Facilities using Service Bureau/Time Share | 58% | 48% |
| Microcomputer owners | 12% | 47% |

Miller found that only 31% of the users owned a computer whereas 66% of the users in this current study own at least one. He also found that 58% of his users used a service bureau or timesharing system while only 48% of the users in this study relied on such an arrangement. Most importantly, only 12% of Miller's users has a microcomputer. This is in sharp contrast to the present study which found that 47% of the users have one. It seems paradoxical, therefore, that there was not a corresponding increase in the number of facilities which are now using computers (51% in Miller's Study versus 54% in this study). The lack of an increase may be because many facilities which were using computers have simply acquired additional (micro)-computers and the number of users has not, therefore, risen. Alternatively, there may be some difference in the types of facilities which the two studies sampled.

Users were also asked to list the brands and models of their computers. There were over 90 separate brands or models listed among the returns. The twenty most frequently cited models and the number of facilities using them are listed in Table 5.

TABLE 5

The Brand and Model of the Computers Most Frequently Used in Rehabilitation Facilities and the Number of Facilities Using Them

| Computer Brand/Model | of Users |
|---|---|
| Apple II | 224 |
| Radio Shack (all models) | 138 |
| IBM Personal Computer | 78 |
| IBM System 34/38 | 67 |
| IBM 360/370 | 52 |
| ADP 1750 | 29 |
| Digital Equipment PDP 11 | 23 |
| Commodore 64 | 21 |
| Burroughs | 21 |
| Datapoint | 18 |
| Hewlett Packard 3000 | 16 |
| Texas Instruments | 15 |
| Compaq | 15 |
| Wang | 14 |
| Qantel System 20 | 12 |
| Televideo | 11 |
| Altair 8800 | 11 |
| Franklin Ace | 10 |
| Basic IV | 10 |
| Vector 3 | 9 |

## Costs of Computer Use and Operation

Table 6 presents the means for hardware and software purchasing costs and the annual operating cost for each class of computer. There are sizeable differences in the costs of different classes of computer systems. The hardware costs include peripheral devices such as printers,

TABLE 6

Mean Costs of Hardware, Software, and Annual Operating Expenses for Users of Microcomputers, Minicomputers, and Main Frame Computers

| | Type of Expense | | |
|---|---|---|---|
| Class of Computer | Hardware Cost | Software Cost | Annual Operating Cost |
| Microcomputers | $15,379 | $2,304 | $8,683 |
| Minicomputers | $61,021 | $11,137 | $16,320 |
| Main Frame | $453,283 | $106,966 | $191,214 |

There were 231 microcomputer users, 86 minicomputer users, and 15 main frame users included in these analyses.

monitors, modems, etc. The costs for annual operating expenses include personnel costs. With many mainframe and minicomputers, a computer specialist would need to be hired to operate the system.

## Training Needs of Facilities

A number of analyses were performed to determine the training and software needs of current computer users. The respondents were asked to rank the importance of various computer related information needs. The results indicated that the highest priority for facilities was for customized software programs written specifically for rehabilitation operations followed by a need for short-term training, then an introductory handbook, and finally, development of a computer user's network. A strong need for all these resources was indicated as evidenced by the fact that 67% of all users indicated a need for both the handbook and the user network, despite the fact that these were ranked as the two lowest priorities. With regard to the need for short-term training, 50% of the respondents indicated that the training programs already available in their locale were adequate. However, 65% of the respondents that indicated a need for short-term training expressed a willingness to send staff to short-term training seminars specifically focused on computer use in rehabilitation facilities.

## Analyses of Facilities Which Currently Do Not Use Computers

One of the principle questions of interest concerning the 722 nonusers that responded was whether they planned to purchase a computer within the next 18 months. This issue was addressed in an effort to gauge the future growth that can be expected in this field. It was assumed that any facility that did not plan to purchase a computer within the 18 month timeframe was probably not serious about purchasing one.

In response to this question, 29% stated that they would definitely purchase a computer within the next 18 months; 46% indicated that they may purchase one; and 25% stated that they definitely would not purchase one. The latter group was asked why they would not be purchasing a computer. A summary of their responses is presented in Table 7. Lack of financial resources is the primary reason given by this group for not purchasing a computer.

TABLE 7

Reasons Why Facilities May Not or Will Not Be Purchasing A Computer Within Next 18 Months

| Reason For Not Purchasing | % of Facilities |
|---|---|
| Lack of financial resources | 71% |
| Lack of Experienced Personnel | 35% |
| Not Convinced of Benefits | 15% |
| Insufficient Knowledge of Computers | 31% |
| Other | 11% |

## Summary and Conclusions

A number of important findings have resulted from this research. Foremost among these is the dramatic growth in computer ownership which has occurred in the last two years. One of the implications of this finding is that the future will see an increasing trend toward the development of customized software for facility applications. The need for this type of software was listed as the number one priority among users. And with more users having access to their own systems in-house, it is expected that development of much of this software will take place within facilities themselves as well as through commercial publishers and vendors.

Another clear finding of this study is that facility personnel have a great need for information concerning computer use, despite the fact that there is literally a flood of such information currently available in the computer industry. More than 60% of the users indicated a need for training in such areas as computer system management and computer applications. Indeed, more than 30% of the computer users indicated a need for training in computer selection and over half need information on computer programming. There is also a need for customized software with over two-thirds of the current users indicating a need for customized administrative and production programs. Two-thirds of the users also expressed a need for an introductory handbook on computer use in facilities as well as in forming a nationwide facility computer users' network for the exchange of information. as a direct out growth of this research, the Center will soon be issuing a national directory of facility computer users which will serve as the basis for developing this user network.

Another important finding of this research is evidence suggesting that computer use in facilities is likely to expand in the immediate future. Twenty-nine percent of the current nonusers indicated that they would definitely be purchasing a computer in the next 18 months. And another 46% of the nonusers indicated that they may purchase a computer within the same time frame. With the dramatic increase in computer ownership already identified, and the expectation that microcomputers will continue to decline in cost, the evidence suggests that computer use is likely to expand dramatically in facilities in the immediate future. With the expansion of this market, it is likely that customized software development will become increasingly common.

Finally, it should be noted that this paper presents a necessarily brief discussion of this project. Space limitations do not allow for a complete analysis and discussion of all the issues addressed in this research. Several additional concerns which were included in this study focused on software ratings by users, what customized software has already been developed in facilities, the use of consultants, problems in system development, and several other important issues. A number of important resources were also identified through this project and will be listed in the previously mentioned directory of users. For example, a number of commercial vendors which have already developed customized software for facilities were identified. In addition, a specialized project funded by the Rehabilitation Services Administration in conjunction with Metro Industries in Louisville, Kentucky was also identified. This three-year project focuses on the development of customized software for facility use. This software will then be made available to facilities at a minimal cost. All of these issues and many other findings from this research will be addressed in detail in the final project report and the national directory of facility computer users which are expected to be available from the Center in early 1985.

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# THE USE OF COMPUTERS IN VOCATIONAL ASSESSMENT

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**ABSTRACT:** The work of vocational assessors at Seminole Community College is reviewed. Examples of the application of modern computer technology to vocational assessment are offered with examples of computer assisted validity studies, scoring procedures, and report writing. Plans for future use of computer interactive video technology for work evaluation are discussed.

This paper will focus on the computer-assisted aspects of vocational assessment. It will outline various concepts and computer based studies which have been done at Seminole Community College. In some cases these studies have been completed and in others they are still in process, but they all illustrate the significance of computers to vocational assessment's validation, relevance to public education and rehabilitation, and to the control of the costs associated with assessment activities.

The work of the "work evaluator" is that of the scientist (Lingoes, 1979). The scientific challenge of work evaluation is to objectively compare an individual to work demands. Using a computer can offer an evaluator logical precision in this effort. The precision imposed by the computer requires that the evaluator carefully understand the nature of the data which he or she is collecting. In order to best fit information into a computer, that information should be in fundamentally yes/no formats. This is because the computer's intricate system of logic rests on electronic equivalents of yes and no.

There are many questions which can be answered about an evaluee by an evaluator in a yes versus no fashion, yet at first glance these questions may appear much more complicated. For example, task analyses provide clusters of work elements which are put together in work samples. A work sample fits into a computer's logic in the form of a question requiring a decision; e.g., "Can the evaluee successfully perform this work in competitive time?" In order to answer this question the computer may be called upon to sum how many times an evaluator observed a certain evaluee behavior or to keep track of the seconds which have elapsed from the time the evaluee stated working. By doing the above and possibly other logical manipulations of evaluator input, the computer can output scores, graphs, narratives, and whatever a good programmer can engineer.

What about work samples themselves? Can the computer be used to study the psychometric quality of work samples? In a study done at Seminole Community College (SCC) in Florida, evaluators break down their observations of evaluees into a series of yes and no questions. Examples of these questions were: Did the evaluee hold the hammer at the end of its handle without being told? Did the evaluee pick up the pieces of tin without dropping them? Was the evaluee's time to completion faster than 7 seconds?

This humble beginning has led to some startling results. When this effort started, SCC's Work Evaluation program took three weeks, employed 5 Full time staff, and required 7,000 square feet of space. When computers were brought to bear on an analysis of the efficiency of this effort, the procedures were reduced to four days, space to 1000 square feet, and personnel to two. By using computers to analyze evaluator observations in the form of yes or no statements, a good many of the observations were found to be frequently the same for almost all of the evaluees encountered. These items obviously added little to an evaluation report. Based on this analysis, observation procedures were revised.

With tighter control on how and what was observed, the computer was used to study the intercorrelations among the observations which were left. Based on the results of these factor studies, the meaning of the observations was enriched. In those evaluee cases which were tested both with the General Aptitude Test Battery (GATB) and work samples, a computer was used to assess whether GATB scores and work samples data were related. This study encouraged further use of work samples because it was found that work sampling was tapping the same general performance domains as the GATB, yet work samples yielded additional information about work style, test taking attitudes, time related endurance, etc. In this example, computing the relationship between work samples and a well researched, famous psychometric device like the GATB, yielded evidence of work samples' concurrent validity and provided statistical support for the use of work samples.

Anytime there is a great deal of information to be processed, computers are a valuable asset. In the following example from the field of Special Education, the dilemma for the evaluator is to keep track of how many correct and incorrect responses a student gives to tests given at the end of each teaching session; further, this teaching technique, known as Precision Teaching (Fox, 1982), requires a precise counting of how many seconds or minutes it takes a student to complete the response process. At SCC, records for precision teaching are kept on a computer. The computer uses this basic information to calculate the learning rates of each student for each lesson the student attempts. Other statistics regarding the student's improvement and the reliability of the student's response pattern are calculated.

Since precision teaching involves the development of a database on training outcomes and very careful control of intervening variations in the lesson plan and teacher delivery format, the records kept by precision teaching personnel are currently being used in a computer assisted study of the predictive validity of the Work Evaluation program at SCC. This is being done by means of several computer programs which relate work sample scores to learning curve results. For example, a dexterity work sample score is used as a predictor variable in a regression equation on lessons involving the use of the hands (clothing production, dent smoothing, etc.). High scores on dexterity work samples should be predictive of faster learning rates on dexterity based learning tasks.

Stated in the form of testable hypotheses, SCC is in the process of understanding the relationships of work samples scores to learning outcomes. Without computers this important aspect of vocational assessment research would be too costly and time consuming within the context of public education settings.

Besides concurrent and predictive validity studies, the computer has allowed SCC to score work samples in ways that would be far too time consuming if done with a calculator or by hand scoring. Because SCC uses a computer to record sample scores, the computer is available at the point of evaluation. This allows SCC evaluators to input behaviors witnessed during the evaluee's attempt to get through the sample. SCC has developed an instrument called a Work Sample Behavior Checklist (WSBC) which includes a panorama of behaviors witnessed by evaluators over ten years of evaluation experience. By inputting the behavior's code number, the evaluator can attach a given behavioral description to a given work sample score. This easy to do computer programming routine has added an affective dimension to work sample scores. The WSBC allows for easier report writing because it captures "discrete data" in a standardized manner. This information in conjunction with interview results, personality testing, and small group work points out key motivational issues in the evaluee.

During the ten years that SCC has utilized Work Evaluation with vocational and special needs students, literally thousands of evaluation reports have had to be written. This one activity has probably taken more time and effort and been subjected to more public scrutiny than any other aspect of the Work Evaluation process.

Computers have been used to make report writing an easier process which yields interesting and useful information to the teachers and caseworks who read the reports. This has been done in two ways: each time a report was written, records were kept of the evaluee's diagnosed learning or behavioral dilemma. The suggestions made in relation to the dilemma were also recorded. Coding was used to allow computer retrieval of suggestions in relation to specific dilemmas. After at least thirty cases with similar problems were diagnosed, the computer was used to list the suggestions given for the solution of the problems. As this process developed better and clearer relationships to presenting problems, solutions were incorporated in a prescribing catalog. This catalog is keyed to work sample score levels by use of a programming technique known as "three dimensional array". This procedure offers many of the advantages of the prescribing catalog utilized in the Individualized Manpower Training System in Florida with scores from the Tests of Adult Basic Education (CTB/McGraw-Hill, 1967).

The second way that computers have helped in the writing of reports is by use of a widely expanding area of office practice called Word Processing. Interpretive phrases which relate to work sampling scores, observed behaviors, and other aspects of a work evaluation report are given computer code numbers. When writing a report, the report writer can save a great deal of typing time by simply listing the computer codes which relate to the evaluee's performance. The report writer types in the unique aspects of the evaluee's report and then the computer connects and prints out the general coded sections of the report. These two report writing computer assists have been most helpful in getting reports out in time and with less effort.

A new vista for vocational assessment and computers is in the area of computer interactive video. SCC is in the initial phases of making its sample system one which is not only computer interactive, but also one which allows the evaluator and/or evaluee to "travel" through the sample system based on his or her successes or failures.

The journey will start with the evaluator and/or evaluee inputting the case features which are unique to the evaluee (name, address, presenting problem, questions to be answered in evaluation, etc.). The evaluee will start with a broad sample challenge which is designed like a preliminary talent assessment. Based on the evaluee's experience on this locator challenge and on the probability tables in the computer's memory, the computer will assign the next sample challenge. This process continues until the evaluee exhausts the samples which he can and wants to do. The computer will then go to the report writing mode outlined above.

The journey through samples will involve a process similar to The Singer Company (1979) in which pictures, sound, and tactile stimulation will help the evaluee understand what to do. The difference will be that instead of sound/slide, the computer will call up video segments of instructions from an interactive video disk. This will bring together the communication power of television with the wide spectrum of talent assessment capabilities of vocational assessment.

In summary, computers and vocational assessment are logical partners in testing and curriculum planning for special needs and vocational students. Computer based simulations have revolutionized training and testing in the military and industry, and now they are changing education and rehabilitation. There is little doubt that computers and vocational assessment have changed the dominance of verbal and written testing for special needs populations, and that the future will open up new and better ways to understand special students and their unique training needs.

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# EMPLOYMENT THROUGH REHABILITATION TECHNOLOGY AWARENESS: A MULTIDISCIPLINARY APPROACH

WM. F. JOHNSON

**ABSTRACT:** Rehabilitation engineering efforts have resulted in many new devises that can be used by persons with disabilities. This explores the ways that these technological products can be used by and for handicapped youth.

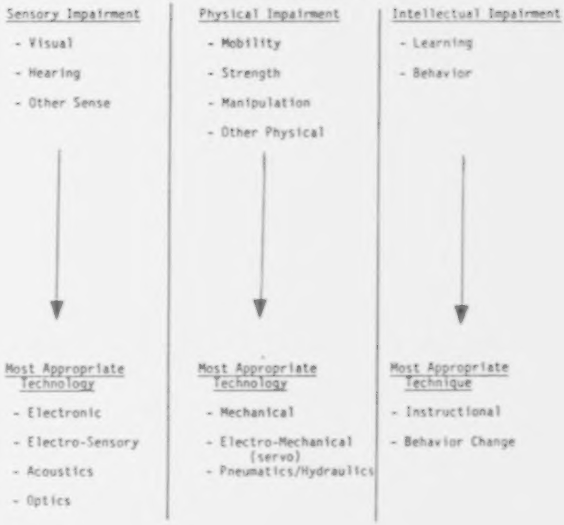
As a natural outcome of any sustained engineering effort, rehabilitation engineering has resulted in a large offering of new technology for the needs of the disabled. In addition to the products of special rehabilitation engineering centers funded nationally by the national Institute for Handicapped Research, there also exists on the market a wide range of commercial products. One need only visit the exhibit section of any national conference dealing with technology and the disabled to discover the expanse of this commercial industry and also sense its growth. For professionals in the field this means an ever increasing variety of aids and devices to overcome the handicapping conditions in almost any physical environment. This paper is concerned with the promise those technologies hold as a possible starting point for linking various professionals to meet the needs of handicapped youth. In this paper, it is also recognized that most barriers to successful vocational preparation of handicapped youth are not just barriers in the physical sense. It is hoped that special educators, vocational educators, vocational rehabilitators, and potential employers will be able to apply new technologies in simple, efficient ways to remove design barriers in learning and working environments. These professionals may have a common interest in technology because of their technical and industrial backgrounds. By solving problems through technology, it is hoped that multidisciplinary teams can go on to solve more intricate and less tangible issues dealing with employability, issues such as behaviors and attitudes. After all, employability is the one key factor needed to link a transition from school to work.

Just as a work site or job station in industry is modified to allow use by a disabled individual so must learning sites or environments be modified to meet special needs. As training in industry (sheltered or competitive) is modified to accommodate individual disabilities. Teaching methods and curricula must also be modified to alleviate the effects of a disability and allow learning to take place. Once learning obstacles are removed from the instruction design or setting, the disabled student is like any other student.

Modification aware educators and employers are confronted with an enormous diversity of aids, devices, and techniques used to accommodate different disability types. It might be good for colleges and universities who prepare educators in vocational and industrial education to require undergraduates to take a course in the nature of disabilities. This may help overcome a new teacher's shock when confronted with a disabled student in their classroom. However, there may be a simpler approach that, for the present, offers a basic analysis of disability types and the various technologies which are most effective with them. A three way breakdown of disability types is illustrated in Figure 1. When considering this illustration, the observer must be cautious. First, most disabled individuals do not fit neatly into one of three categories. For instance, a mentally retarded individual may have a cardiac condition limiting strength and, as well, a visual impairment. Second, this illustration places instructional and behavioral techniques on a plane with "hard" technologies. With these cautions in mind, one can proceed to use the concept to its best effect. That is, to find where technology interfaces with the effects of any disability.

FIGURE 1

Special Populations



Returning to the example presented a mentally retarded individual with cardiac and visual impairments, and educator or potential employer will see how the various technologies impact on the individuals needs. A component solution in formed using an optical solution to the visual barriers, a mechanical assist to overcome the physical barriers, and a specialized teaching/training technique for the mental impairment. The composite solution, upon application, promotes access to learning or employment. This basic understanding of the effects of disabilities and knowledge of the search procedures for answers provides a starting point and a link for all professionals involved.

A multidisciplinary approach is the foundation of any successful school to work program. The demands that educators and employers understand the efforts of each other and realize the benefits to business and community. Employers are most likely to support and involve themselves in education programs that they see as providing a selection of personnel with appropriate work behaviors and skills related to their operations. Employers will also find that these kinds of programs are made up of teams in the educational sector. Teams made up of vocational, industrial, technical, and special educators with ties to vocational rehabilitation and other involved professionals are the only answer to solving the melee of problems encountered when handicapped youth move through the main stream of the system.

Before technology or other methods can be effective, student characteristics and instructor time must be considered. Teachers are confronted with problems involving behaviors and one-on-one instructional time from mainstreamed special education students in their classrooms. In our exploration of technology and use of special methods teacher's complaints in these areas cannot be ignored. Successful programs facing the demands made by PL94-142 gather knowledge of the content and goals contained in the IEP for each student and knowledge of how behavior change programs are monitored and carried out for each student. Every educator involved must know and be a part of the total program.

Mainstreaming represents not only a dramatic change for students but for educators as well. They experience a major shift in attitude and responsibility. Hippolitus (1980) states "a widespread belief by education programs, including special education programs, that it's somebody else's job to get disabled young people ready for work. Generally it is felt that the state-federal vocational rehabilitation program is the agency responsible for this effort. When we realize that approximately 650,000 handicapped young people leave out nation's education system through graduation or termination of eligibility each year, we being to realize that the state-federal vocational rehabilitation program is nowhere near big enough to serve our young handicapped population." There is also a prevailing attitude on the part of many educators that the students they encounter, because of so many behavioral and even skill related problems, will simply never be employable. They give up, in a sense, and resolve themselves to sustaining a program they feel can have no positive effect. Hippolitus (1980) also states "occupational negativism about disabled people stiffles creativity and creativity is the mark of a good education program." The importance of disabled youth learning career related skills while in the school system cannot be understated since the chances for them to obtain such skills elsewhere are minimal even through the state-federal vocational rehabilitation program. The result of course is a tremendous waste of manpower. Bowe (1980) found unemployment rates in excess of 50% for handicapped adults.

Instructional programs for disabled youth need to be career related but not job specific because of many job changes may occur throughout an individual's years of employment. It makes good sense however, to relate career programs to actual employment settings in the local area or community. Special educators must learn to make their programs reflect the reality of the local labor market much as vocational evaluators have learned to design assessment tools based on local industrial operations. This implies the use of job analysis, another tool used by vocational rehabilitators, and may also be another point of interaction between educators and employers. Rehabilitation facilities can also be a valuable resource in furthering the special educator's link with employers. McCray (1984) states that "most facilities have worked with secondary level school based programs providing specialized services like vocational evaluation, work adjustment and job placement." A visit to a facility can provide an educator with a basic understanding of training and work modification which could, in turn, prove most valuable in the development of specialized methods in their school settings.

When applying technology or modifying instructional design for handicapped youth perhaps the best resource is the student. An individual who has lived with a disability may be well aware of what is needed to overcome its effects. Special products may then be found or a change in method initiated. Perhaps the best place to start looking for equipment and aids to meet special needs is the ABLEDATA system.

ABLEDATA consists of a national computerized databank containing information about rehabilitation products and a network of information brokers. This resource includes more than 8,000 commercially available aids and equipment, to date useful to disabled persons. Another resource is the Vocational Studies Center at the University of Wisconsin-Madison. An updated catalog is available from the Center entitled Tools, Equipment and Machinery Adapted for the Vocational Preparation and Employment of Handicapped People. This catalog contains descriptions and illustrations of 283 products modified for used in the vocational education and employment of handicapped people. The Center also publishes a handbook entitled "Puzzled About Educating Special Needs Students?" The handbook is ready reference to modifying instructional methods for special needs students. Other references are available from the President's Committee on Employment of the Handicapped which the reader may wish to note in the reference section of this paper.

The techniques used to remove barriers within learning environments should be related to the techniques that may eventually be used to modify employment settings. Furthermore, all "vocational" modifications or applications of technology must be realistic in terms of applicability to actual available, or potentially available occupations. Employers confronted with hiring a disabled person will be more likely to accept a person who has already demonstrated success with modifications in learning situations which were similar to the kinds of tasks contained in their industry operations.

Educators must also be aware that employers are mush more willing to accept modifications that are simple, efficient, low cost, and that do not effect other workers using the same work station. High technology applications can produce amazing results but educators must strive to first maximize the abilities of the individual and then to apply technology only where necessary. This approach, although demanding of much creativity and insight, keeps the individual's potential and independence high while keeping the cost and burden of technology at a reasonable, acceptable level. The practice of creating simple and efficient modification also results in a higher student acceptance. Educators should design modifications that are the least conspicuous and do not draw attention to the handicapped thus increasing the normalization element of the process.

The goals of rehabilitation technology are directly related to the objectives and endeavors of educators and employers. They are: to expand individual vocational options; to enable disabled persons to pursue more teaching and training options; to increase successful employment; and to increase productivity. Applying technology in combination with other suitable modifications provides a common link, a starting point, where all concerned professionals can, with barriers removed, move toward achieving the highest level of satisfaction and performance for their students and employees.

Instructional Catalogs and Materials are Available From:

The Vocational Studies Center
University of Wisconsin-Madison
265 Educational Sciences Building
1025 W. Johnson Street
Madison, Wisconsin 53706
(608) 263-4357

The following publications are available, free of charge by writing: Paul Hippolitus, President's Committee on Employment of the Handicapped, Washington, DC 20210:

"Resources for the Vocational preparation for disabled youth - An annotated bibliography and resource list for information on the prevocational, vocational and career education of disabled students.

"People - Just Like You"
- A six hour lesson plan for teachers of non-handicapped students on disability and the potential of disabled people.

"Blueprint For Action"
- A comprehensive review of current issues and barriers facing handicapped youth in education and training with suggested steps for local groups and individuals.

"CETA - An Employment and Training Resource for Disabled Young Adults"
- A review of the advances made by the 1978 CETA amendments and their potential for handicapped youth.

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# MICROCOMPUTERS AS PROSTHETIC AIDS FOR THE SEVERELY PHYSICALLY DISABLED

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**ABSTRACT:** Tremendous technological increases resulting from the boom in microcomputer development has had an explosive impact in the development of special aids for disabled persons. Successful applications of technology have lessened the discrepancy between the individual's capabilities and his environmental demands. The artificial intelligence of the microcomputer has been integrated into the design of power prosthetic or robotic manipulators. Another area of prosthetic assistance to the severely disabled has been the development of communication aids; two major categories of communication aids employ microcomputer technology. Numerous factors are included in the selection of a communication device. The particular device selected must possess the capability to be operated independently and by designed to meet the individual's needs. The microcomputer's assistive capacities enable those individuals previously thought completely disabled the ability to assume some measure of productivity. The microcomputer offers the means by which an individual may control his surroundings and himself, as well as communicate with others. The aids discussed in the text represent successful application of advancements in microcomputer technology.

The past few years have witnessed a tremendous increase in technology with the advent of the microcomputer. In conjunction with the explosive impact of the microcomputer has been the impact of individuals and small groups involved in the development of special aids for disabled persons. Interference with mobility, manipulation of the environment and effective communication caused by various neurological and neuromuscular conditions has been overcome with the use of artificially intelligent prosthetic devices. These aids have allowed individuals the ability to be as independent of constant attention as possible and to enhance their way of life.

Mobility has been one of the most acute requirements of handicapped persons. Without mobility the individual's capabilities were severely limited. Good, reliable powered wheelchairs were an outgrowth of the mobility needs of the handicapped. The Wheelchair II Workshop held at Moss Rehabilitation Hospital, December, 1978, recognized that the microcomputer offered vast improvements over existing control systems. The microcomputer provided the sophistication, flexibility and compactness required for such features as automatic speed limiting, programmed acceleration an deceleration, obstacle avoidance, battery monitoring, and component temperature monitoring (Aylor, Johnson & Ramey, 1981).

The University of Virginia Rehabilitation Engineering Center developed a microprocessor-based wheelchair which provided many of the aforementioned functions. Critical characteristics of the control system were varied by programming changes to meet individual needs. A digital filtering system extracted the average value of spastic hand movements of the joystick thus enabling individuals with severe spasticity to smoothly and safely operate the wheelchair. Additional flexibility was obtained by a variety of control inputs such as joystick, sip and puff, and hum control. The microcomputer permitted accommodation of these different inputs by using separate written subroutines. Not only did this accommodate the individual's residual capacity to exercise control of the wheelchair, but it minimized hardware interfaces between the user and the microcomputer. This flexibility made this wheelchair system much more tailored to the unique capabilities of the user. The intelligence offered by the microcomputer made possible a variety of complex features while maintaining hardware simplicity and low power consumption (Aylor, et al., 1981).

Similar technological applications have expanded user control from wheelchair to environment. Past difficulties with robotic manipulators were eliminated by the microcomputer ability to develop and remember complex movement command chains for specific types of activities. The user then directed these routines with only a few commands, thus making complex motions with reasonable speed and accuracy (Vanderheiden, 1981). A number of devices have been developed to provide general motions under the operator's control. One such manipulator was developed by the John Hopkins University for the Veteran's Administration. The operator moved the terminal device to any position in its range by operating one joint at a time. A similar development by the Jet Propulsion Laboratory under the joint sponsorship of the National Aeronautics and Space Administration (NASA) and the Veteran's Administration utilized voice command control (Ramey, Aylor & Williams, 1979). The University of Virginia Rehabilitation Engineering Center developed a single chip microcomputer control system which allowed for joystick or hum control of a wheelchair-mounted manipulator. Another versatile system developed by Ramey, Aylor and Williams (1979) permitted severely handicapped individuals to eat independently using a microcomputers-controlled manipulator. The microcomputer not only moved the eating utensil through a preprogrammed path and rotated the plate, but it also possessed a "learning mode" which enabled its adaptation to tasks other then eating (Freedy & Lyman, 1977).

Further, a programmable robotic arm developed at the John Hopkins University Applied Physics Laboratory was integrated into a functional worktable, thus giving persons without the functional use of their limbs the manipulative capability necessary for reading, eating, and using a typewriter, telephone and personal computer system. Experimental systems with the robotic arm have been proposed and designed in both wheelchair and table-mounted versions. This system was operated by the same controller which ran the electric wheelchair. This arrangement permitted full wheelchair mobility with minimal additional components mounted to the wheelchair, thus maintaining a low-profile wheelchair (Schneider, Schmeisser & Seāmore, 1981). The robotic arm/worktable system was designed for the high-level quad who, having no use of his arms or hands, was capable of nearly a full range of head and neck movement and could use a mouthstick for turning pages and operating a keyboard. The controller responded to commands from the user and his environment and commanded the mechanical arm to perform some useful motion. The software design for the controller implemented all tasks necessary for the proper operation of the mechanical arm either as a telemanipulator or as a robotic arm. Through clinical tests of the system, the computer was shown to be a significant factor in the design of the robotic arm control system as well as a key component of the worktable. The designers have planned attempts to broaden the task capability of the device (Hazan, 1981).

Erich Sutter of the Smith-Kettlewell Institute in San Francisco has developed a seemingly telepathically controlled computer. To control computers, telephones, lights and other electronic devices the user would gaze at a flashing light; brain waves and computer software would do the rest. To use the system, electrodes like those used for an electroencephalagram needed to be worn. The system utilized a separate light for each device to be turned on or off or for each choice to be made. These lights flashed in a carefully chosen pattern, a repeating sequence taking nearly three seconds to complete. The viewer responded to the flickering with a distinctive pattern of brain waves that changed recognizably as the different lights flashed their sequence. The computer compared the user's brain waves with a pattern in its memory. When a matching pattern was found, the computer knew which light was looked at and operated the device. This system was used to communicate, to command light switches, televisions and even meal-carrying robots. This system even enable those who could neither type nor speak to enter text into a computer by simply gazing at a single character on a display board.

Yet, another area of prosthetic assistance to the severely disabled has been the development of communication aids. The nonvocal disabled person entering the mainstream of society was faced with communication problems more severe and complicated than encountered by individuals in a foreign culture. Oral communication was spoken at such a high rate of speed that few people had the patience or attention span necessary to communicate with a disabled individual using a slow manual communication aid such as a laptray letterboard. To communicate effectively, nonvocal disabled individuals needed communication devices specifically designed to meet their particular and practical requirements within today's society. At the Biomedical Engineering Center of Tufts - New England Medical Center, the communications problems of disabled people were addressed through a coherent philosophy of electronic device development (Thomas, 1981, p.25). This philosophy stressed personal, portable and affordable as key concepts.

Currently, two major types of communications systems for the nonvocal disabled have been manufactured commercially: a scanning system that presurposes a user with voluntary motor control of one muscular action and a direct selection technique, usually accomplished with a mouthstick, hand/arm control, or a headpointer of some type. The Direct-selection technique has required better muscular control than for the scanning system, and fatigue has played an important role in communication speed (Thomas, 1981). Generally, the majority of communication devices utilizing microcomputer technology of late, have been capable of functioning in either of these modes depending on user ability.

One such device was developed by Carol A. Simpson, Ph.S., of Psycho--Linguistics and Douglas H. Williams, Ph.D., who drew on their collective experience in developing synthesized voice systems for NASA. Their talking wheelchair, formally named Versatile Portable Speech Prosthesis (VPSP), adopted existing hardware which was mounted on wheelchair and run off a standard 24-volt wheelchair battery. The system further incorporated a microcomputer, a disk drive, a speech synthesizer, and a modified five inch television set.

The user had three choices to control the system depending on his physical capacities. The easiest and fastest method was the keyboard which could be operated by finger touch or a headstick (Deane, 1982). Using a joystick control, the cursor was moved to the desired word or letter and selected by the press of button. For those too severely handicapped for the keyboard or joystick version of the VPSP, the single-switch mode could be utilized. In the single--switch mode, the computer moved the cursor and the user pressed a button to stop the scan where wanted.

Similar to the VPSP, another wheelchair portable device was developed. With this device, a box in the back of the wheelchair held the electronics, microprocessor and voice synthesizer; a display and printer combination was mounted on the side of the wheelchair where it would be most easily visible to the user; an adaptive joystick was located next to the body part capable of manipulating it-hand, foot, or head, depending on the user (Rahimi, 1981).

Many nonvocal individuals have, however, learned to communicate with others using devices such as the Blissymbolic Board. The Bliss Board was composed of an array of symbols. The handicapped individual relayed a message by indicating the set of symbols representing the intended meaning. Since Blissymbolics is a purely graphic communications system, interpersonal communication has required the presence of an interpreter familiar with the system for translating Bliss Syntax into English. A significant advance for Bliss users was the development of computerized talking Bliss Boards such as the Semantically Accessible Language (SAL) Board. SAL combined microprocessor and speech synthesis technology to create a portable lap Bliss board permitting the nonvocal user to more freely communicate by producing synthesized English speech from Bliss symbols (Bennett, 1982, p.111). These devices also allowed users to compare ideas before speaking (Rahimi, 1981).

## Summary

The previously mentioned prosthetic aids for the severely physically impaired were developed as a direct outgrowth of the microcomputer boom. Artificial aids -- communication or otherwise -- can improve the quality of life for the disabled. With technological advances such as they are, the resources are available to build aids to compensate for many disabling conditions. Microcomputers have brought independence for the disabled closer because so many assistive devices are functionally dependent on computer software rather than expensive hardware ideally, prosthetic and communicative aids require customizing for individual needs. With the programming abilities of microcomputers, inexpensive software and standard devices such as plug-in memory modules, plug-in keyboard layouts, and modular display or audio-output options, the severely disabled individual is able to participate more fully in the mainstream of society. The aids discussed in this text are but a few of the products of the creativity in design boosted by the microcomputer.

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# ETHICAL DILEMMAS--DIFFERENCES IN THE PUBLIC AND PRIVATE FOR PROFIT PRACTITIONERS' POINT OF VIEW

**MICHAEL C. McCLANAHAN**

**ABSTRACT:** Ethics, or the "rules or standards governing the conduct of the members of a profession" (Houghton Mifflin, 1976) is a central issue confronting professionals in rehabilitation. A review of the editorial sections of the most recent issues of The Journal of Rehabilitation show the nature of the ethical issues. The emergence of the private profit sector in rehabilitation is the source of this ethical dilemma. This paper considers the ethical issues confronting rehabilitation practitioners in the private profit and public sectors.

## Ethical Issues--The Literature

Nadolsky (1984), is critical of professionals in both sectors, claiming that "...public agency personnel ascribe to a belief in individualization of service principles; in actual practice they often submit to organizational pressure and fail to provide those individualized services that will enable their clients to achieve an optimum level of functioning ..." while personnel in the private for profit sector" "...find themselves submitting to the pressures and requirements imposed by insurance companies ...a perspective that does not enable them to ascribe to the individualization of service or the optimum functioning principles." Three rebuttal letters to the editor in the following issue of the Journal of Rehabilitation (Atkinson, et al., 1984),arrive at the same, apparently independent, conclusion that the only "crisis in rehabilitation" is Nadolsky's perception. 1984). A review of the literature would suggest that their response is erroneous and defensive. Although Nadolsky's editorial has touched off a multitude of exchanges, debates, articles, and correspondence, his concern is not new. Matkin, (one of the critical respondents to Nadolsky's editorial), and May (1981) published an article 3 years ago on the potential conflicts of interest in private rehabilitation and concluded that the private for profit sector brings with it a number of ethical concerns due to the strong profit motive, the diversity of qualification levels of its practitioners, and the lack of a regulatory governing body. Two years prior to Matkin's study, Lewin, Ramseur and Sink (1979) expressed similar concerns related to the role of private rehabilitation efforts. More generic to the field of rehabilitation is an article on ethics published by Geist, Curin, Prestridge and Schelb (1973) in which they state "...Because of administrative and bureaucratic efforts for self-survival, the agency no longer serves the counselors, but rather the counselor works chiefly to self-survival...somewhere along the line the client and his needs get lost." In 1981 the National Association of Rehabilitation Professionals in the Private Sector (NARPPS) adopted its "Standards and Ethics" (NARPPS, 1981) and created a review board to consider complaints of unethical conduct of its members, and empowered that board to revoke membership if necessary. In addition, the creation of the Commission on Rehabilitation Counselor Certification (CRCC) and its Code of Ethics empowers that organization to "...suspend or revoke certification upon violation of the Code of Ethics" (CRCC, 1981). Tuck (1983) insinuates transgression of professional ethics in the use of rehabilitation practitioners for litigation by stating that "this is not a traditional role for rehab counselors and, in many cases, represents a selling of one's professional soul" and cites Matkin and May (1981) as her source. Matkin and May (1983) respond to this charge saying that their articles did not imply the necessity of selling one's professional soul and that "...ethics rests with professional, not the work environment or job functions." Finally, Cottone, Simmons, Wilfley (1983) surveyed the literature of four national rehabilitation journals and psychological abstracts over the time period of 1970-1981 for articles focusing on ethical issues in vocational rehabilitation. There conclusion was "...there were many publications on ethical issues in vocational rehabilitation between 1970 and 1981, closer examination reveals a relative paucity of articles on topics specific to rehabilitation practice."

### Practitioner Interviews

In order for this writer to formulate as objective a set of impressions as possible related to the ethical dilemmas encountered by practitioners in both the public and private sectors, informal individual interviews were conducted. The opened-ended question was asked:

> "Do you feel that you are asked to compromise the rules or standards governing the conduct of the members of your profession in any way? If so, in what ways?

Without exception, individuals in the private for profit sector responded that they felt pressure, either implied or overt, to support the referral sources' point of view. Predominantly, the referral source was insurance companies, although a minority of practitioners verbalized pressure from either the client (if self referred) or his attorney. The second most frequently received response from the private for profit practitioners was that they felt pressure from their respective employers to perform unnecessary activities in order to obtain increased billable hours.

An adjunct to this is that respondents also reported their billing transmittals were either raised or lowered to reflect "appropriate" billing amounts.

Responses from individuals in the public sector of rehabilitation were more varied and thus more difficult to categorize. The trend, however, was that of two responses: (1) caseload/paperwork demands are so high that they interfere with job effectiveness, and (2) the regulations and money constraints are overwhelming.

These obtained responses seem to validate Nadolsky's claim that individuals in both the private and public sectors experience pressure to submit to organizational demands rather than individual needs (Nadolsky, 1984). The individual in the private sector experiences pressure from both the insurance company and their own company, while the public practitioners find constraining regulations and paperwork demands imposed on them by their agency. This further validates Geist, Curin, Prestridge and Schelb's (1973) previously reported study that efforts by the counselor seem to be directed toward the agency survival rather than the disabled individual's gain.

### Rehabilitation and a Changing Society

What has been implied, but not explicitly stated in the literature, is that a growing number of rehabilitation professionals are aware of the changes occurring in the field any many are fearful to the resulting outcome. Rather than seeing themselves as cooperating agencies and companies, one can sense an air of alienation between the two sectors, not unlike that of other organizations who find themselves with divergent backgrounds and somehow similar goals (e.g., professional and college sports, church and social reform agencies, public and private schools, etc.). Many in the public sector seem to be "turf protecting" and claim that practitioners in the private sector are providing insurance work rather than rehabilitation, while private practitioners sometimes counter with claims of ineptness of the public sector rehabilitationers.

This state of anxiety regarding the future state of rehabilitation has the potential to be a "healthy fear." The field of rehabilitation, if it is a dynamic field, has been, and always will be in a state of transition. The field will continue to reflect the transition of society so that practitioners respond to the real needs of the people. Nadolsky (1984) remarks that private for profit practitioners are "...serving to redefine the rehabilitation process..." and that "...programs have cast aside certain basic principles that have been historically associated with the rehabilitation movement..." Is this necessarily and evil? We are presently redefining which people might be considered "handicapped" and therefore qualify for rehabilitation service, either private or public. Public vocational rehabilitation counselors, if given an opportunity, will reflect on "the good old days of V.R." when the "3-H's" were easy "26" closures. This handicapping condition has been redefined. In the embryonic stage of the private for profit movement, many professionals were reported to be totally biased, always favoring the referral source. With the demise of a number of private agencies who were viewed as non-credible, the survivors have learned that objectivity (a quality product) has more substantial long-term benefits. As credibility increases, so do referrals from all sides of the legal posture (i.e., defense and plaintiff). Sink and Craft (1981) suggest that as medical technology advances persons over 65 might one day qualify for rehabilitation services as life expectancy grows, so that the elderly will become a resource rather than a drain. In addition, medical advances will cause the very nature of rehabilitation to change as do the needs of society (Spears, 1983). Naisbitt (1982) notes the coming in of the information age and the exit of the industrially based society, reflective of the fact that clerk jobs became the number one occupation in 1979, replacing laborers, which replaced farmers. Women will constitute 47% of the work force and their income will comprise 40% of the average family income. As society changes, the field of rehabilitation must also, to keep pace.

### Private and Public--Mutually Beneficial

What the private for profit movement has successfully done, is respond quickly and effectively to the changing nature of society in order to meet the people's needs. Matkin (1982) surveyed 268 NARPPS members and listed 29 different services offered by the private sector; a survey which might, in part, refute Nadolsky's (1984) assertion that the "...provision of service to individuals is limited in the private-for--profit sector..." The private sector, in addition to reduced federal spending, has encouraged public sector rehabilitation agencies to heighten their business practices and to seek new markets. Professionals entering or moving about in the rehabilitation field will begin to find themselves with some level of bargaining power for salaries and prerequisites as there is more than "one show in town." As litigation increases, so will accountability, which will ultimately result in better and more efficient services for disabled individuals.

Ethical dilemmas encountered by practitioners in both the public and private for profit sectors is the topic of this paper. It has been shown that a remarkable similarity exists between the two sectors in terms of temptations related to professional conduct. The solution to the issue of handling ethical dilemmas is also remarkably similar. Professionals, individually and collectively, must ardently adhere to the principles governing their profession. Strong professional organizations, solid educational programs, both in-service and formal, are necessary for growth.

The intent of this paper was to compare and contrast one aspect of the two sectors. The similarities having been noted, a word of caution is due. The two movements, although strikingly similar in some ways, is markedly different and non-comparable in others. In some aspects, it is like comparing apples and oranges, or sounds and smells. The ultimate conclusion in attempting to compare two totally different realms might lead to a conclusion in the form of the rhetorical question: "What does an E-flat smell like?"

Mercer (1979), commenting on professional behavior concludes that "we must assume personal responsibility for earning professional respect through active concerns and involvement." Marvin Spears (1983) so aptly put the status of rehabilitation as a function of society and states "Rehabilitation...is changing, and will change drastically in the future--and will do so at a pace that might be stressful." Well, Mr. Spears, it is stressful, but in a positive, healthy way. The rehabilitation movement at this stage can be viewed as painful but exciting growth. Members in both the public and private sector have much to look forward to in this age, and can be proud of their pilgrimage.

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# EFFECTIVE VOCATIONAL EVALUATION OF NON-ENGLISH SPEAKING INDIVIDUALS

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**ABSTRACT:** Increasing numbers of non-English speaking individuals are being referred to vocational evaluation units for assessment and vocational evaluation units for assessment and vocational recommendations. This increase is reflected in schools, in workers' compensation systems and in State Departments of Rehabilitation. Often the referral source has little or no idea of what to do with the client. One key to the effective evaluation of non-English speakers is to have a plan prepared prior to initiating evaluations of this client group. The issues discussed in this paper contribute the client's attitude toward the evaluation experience. The evaluation staff should be trained and educated concerning the discrete and cumulative effects that any of these factors might have upon the course of the work evaluation.

## Cultural Identification

If rapport is to be established between the evaluator and the non-English speaking client, the evaluator must make a conscious effort to learn about the client's culture. This can be done in a variety of manners, none of which require much cash expenditure. One simple method is to go to the public library and check out a few books on the subject. This provides a minimal base which can be used as a springboard for conversation during the initial interview and subsequently during the evaluation. If the evaluation center is near a university or a military base, knowledgeable people are often available to speak to the staff about the cultures and social customs of many countries from which the non-English speaking clients come. Many military personnel have received specific training about proper behavior when working with members of different cultures and they are generally flattered and eager to discuss what they have learned with a receptive audience. Other human resources include organizations or self-help groups that are frequently formed in non-English speaking communities.

Evaluators must take the initiative in learning the basics of the culture of the people with whom they are working. The necessity for this is at least two-fold. First, cultural basics should be learned so that no cultural fauxpas are made by the evaluator. These would quickly sabotage further evaluation efforts. Second, when working with non-English speakers, evaluators must exhibit an interest and knowledge of the client's cultural values and beliefs. If this initiative is not perceived by the client, the evaluator will be categorized as being another member of the dominant culture who does not care enough to show the client the respect due him or her as and individual human being whose language and belief system differs from that of the evaluator.

The client will then separate from the evaluation, viewing it as an alien and futile process to mime through while hoping it will not cause any more harm to their situation.

### Communication/Linguistic Styles

Unfortunately, well intentioned attempts by English speakers to communicate in languages they do not know sometimes result in inadvertent insults, which put clients off quickly. It is commendable to attempt to communicate in the client's primary language, even if only in greetings and thank yous, but the evaluator must be sure that the words used convey the requisite level of respect for the person addressed, are presented using the appropriate gender forms and are spoken using the proper tonal qualities. In Romance languages (e.g. French, Spanish, Portuguese, Italian), there are two forms of "you", one familiar and one formal. When an evaluator uses the familiar form ("tu"), the client has immediately been linguistically delegated to a lower level than the professional person, and a barrier has been erected. Many Asian languages are dependent on tone for meaning, and if an incorrect tone is used the meaning changes. Some Asian languages also share different forms of address denoting varying level of respect. It is preferable to speak in English than to inadvertently insult the clients when they walk in the door.

Language is not confined to verbal communication in this context. Body language and touching customs are equally important, and the evaluator should learn what is usual and acceptable prior to evaluation to avoid potential misinterpretation of actions. It can be deduced that a person who speaks no English does not spend a great deal of time in close contact with members of the dominant culture and thus feels extremely awkward when entering an experience as unfamiliar as vocational evaluation. Again, it is incumbent upon the evaluator to have studied the subject and to set a tone in which the client can feel comfortable.

Now, if the evaluator does not speak the language of the client, and vice versa, what then? The answer of choice is to have a staff member fluent in the language of the client. This is a rarity, in my experience. The next option is to go to the community based organizations mentioned previously for interpret or services. One drawback is that the evaluator has no control or understanding of what is being said to the client, and thus concern exists regarding the preservation of consistency in work sample presentation. Frankly, unless other language instructions exist in written form, there is no consistency in alternate language instructions, except when using the measuring instruments of companies that have made the commitment to offer their manuals in other languages (e.g., Valpar).

When an evaluation center must use the services of an interpreter, the interpreter should spend a day in orientation, reading the manuals, preparing the technical vocabulary, and engaging in discussion with the evaluation staff about what work evaluation is and the importance of not engaging in behaviors that will prejudice evaluation outcomes. An uninformed interpreter can do a great deal to skew evaluation results, and the responsibility for this rests on the supervisory evaluation staff members.

The least desirable situation is the one where no one can communicate with the client. When this occurs, the evaluator must decide whether to continue the evaluation via pantomine, or to terminate. If the decision is made to continue, the evaluator should make clear statements in the report regarding the limited nature of the evaluation and should be extra cautious regarding the conclusions and assumptions he or she makes, based on the accumulated data.

When working with a non-English speaker, the evaluator should employ empathy. Putting oneself in the client's shoes often aids in the making of the decisions required in this evaluation process.

### Immigration Questions

This is not a section debating if the client is in this country legally. That in not necessarily in the domain of the vocational evaluator and will not be discussed in this paper.

Most non-English speakers are first generation immigrants to this country, and share the problems and concerns that immigrants have historically faced. They often share great feelings of hope and feelings of fear and cultural alienation. Some speak no English because they say giving up their primary language is like giving up their identity and their pasts. It becomes a question of loyalty to the culture of origin and a quest to retain the roles and status they had (or would have) attained had they not come to the United States.

Other reasons for not speaking English include fear of making mistakes, embarrassment because of an accent, lack of exposure to English speakers or even a lack of foreign language learning aptitude.

The immigrant status of the client should lead the evaluator to get information concerning the reasons for immigration, the conditions (is your client a "boat person"), the length of time in the United States, the geographic location of the client's family the academic training the client received in the "old country", the client's previous social and vocational status, etc.

There is again a two-fold reason for these questions. First, they give the evaluator information on which evaluation plans and ideas can be based and, second, they give the client a chance to express his or her individuality and pride concerning themselves and their accomplishments. If these types of questions are not asked, there is a danger that clients will be stereotyped, and stereotyped negatively. Non-English speaking is not synonymous with being uneducated, and if assumptions are made regarding transferable skills and the like, then evaluation becomes a tool for the detriment, rather than for the benefit, of the client. Unless the evaluator takes the time, during the course of the evaluation, to get to know the individual, the recommendations will start to become "canned" and the evaluator will be conducting sub-standard vocational evaluation.

As an aside, these conversations often bring out fascinating stories of life in other countries and of the difficulties encountered during the trip to the United States. Participating in discourse with the client will often bring about a mutual respect and education that would not otherwise occur. An evaluator should never underestimate how much they can learn from their clients, especially when communication can be established with non-English speakers.

### The Disability

The perception of disability and its proper treatment is culturally influenced. One more area in which the vocational evaluator needs educating is in the health beliefs of the clientele. Evaluators should familiarize themselves with both the folk medicine systems (e.g., the "curanderos" in the Mexican communities) and the terminology used by members of the culture at hand to describe different sensations and symptoms. If this is not done misunderstandings can occur that will lead to improper interpretation of physical tolerance data. Again, the evaluation staff should find a community resource person (or group) that will come to the office and provide a few hours of informative training. If this is not possible, check for information in books or network with other professionals who might have some insights they would be willing to share. This is especially important when discussing physical activities with the clients, and should not be overlooked or dismissed as extraneous.

The factors that have been outlined so far in this paper are by no means comprehensive. Issues such as gender role identification, which is another important aspect, have not been brought out, mostly due to space considerations. Being cognizant of these factors, however, is not sufficient preparation for working responsibly with this clientele.

Once the staff is fully educated regarding these and any other pertinent issues, action must be taken to ensure that staff knowledge is manifested in staff performance. This extends to all office staff, not solely to evaluation personnel. The evaluation office should be set up in such a way so as to create an atmosphere that is hospitable to the non-English speaking client. This includes decor, methods of interaction that are culturally acceptable, and the proper selection and usage of culturally and linguistically appropriate evaluation tools. The staff and the office environment must reflect a respect for and a consciousness of the targeted population in order for effective vocational evaluation to take place.

It is during the evaluation itself that the importance of manifesting a cultural respect and understanding comes to the forefront. If the client is not made to feel accepted as a contributing party in the evaluation process, the results will be skewed. This is where the credibility problem that has existed between evaluation professionals and this population comes to a head. If the client feels that he or she is in an alien environment, test anxiety is never erased and evaluation performance (as opposed to work performance) becomes suspect.

It is impossible to over-emphasize the necessity of showing respect and tact when working with this population. Vocational evaluation is a very frightening process to a non-English speaker, and these clients are nervous and anticipating a failure situation. Respect appears to be the greatest catalyst in the reduction of test anxiety in this group. If respect is not shown, the evaluator loses the client's motivation to do his or her best, as the client feels there is no point because derogatory decisions have already been made and cast in stone.

When this happens it leads to the making of recommendations that can be unrealistic or even counter productive. It is up to supervisory evaluation professionals to assume the responsibility of properly educating their staffs to ensure that the non--English speaking client is given the same opportunity to benefit from evaluation services as the English speaker. When this effort is not made then, as has sometimes been the case, vocational evaluation becomes a tool to exclude people from the labor market, rather than a bridge to vocational success.

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# A TRIADIC APPROACH TO THE VOCATIONAL ASSESSMENT OF THE INDUSTRIALLY INJURED

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**ABSTRACT:** For many years the vocational assessment of the industrially injured worker has been standardized on a sequential two-step approach - psychometrics and work sampling. The Occupational Rehabilitation Center has added a third, work tolerance screening, which has effectively allowed the development of a unique program with comprehensive results. As a holistic, measurable approach, it has added a new dimension which allows all phases of assessment to interface completely with more successful outcome.

Various standardized psychological/psychometric tests are used at ORC to assess an individual's interests, aptitudes, intelligence, academic achievement levels, values/attitudes and personality. The selection of a particular psychological/psychometric test is directly related to the individual client, and, is used only to identify personal, social and vocational strengths and weaknesses of that individual client, and predict his vocational potential and work behavior.

Several of the worker characteristics which presently used Psychological/Psychometric tests are intended to assess and include the worker's ability to concentrate on tasks, comprehend and follow instructions, maintain motivation, communicate, think logically, remember, tolerate pressure and relate appropriately to co-workers and supervisors. In addition, such testing is conducted to evaluate other areas including stress, sensitivity to secondary gain, malingering behavior, and psychological trauma. As is the case with both work sample assessment and work capacity assessment, psychological/psychometric assessment places an emphasis on observing the client's related work behaviors which may enhance or interfere with successful employment.

In general, the ORC staff uses psychological/psychometric testing when there appears to be a need because:

1. There is a specific question that needs to be answered, including the individual's ability to concentrate, remember, think logically, manage financial benefits, read/figure, adapt/-adjust, and/or cope.
2. Data in the file is outdated, or seems to be outdated for some reason.
3. The individual has had possible involvement with head injury, alcoholism/substance abuse, emotional breakdown, psychotic

break, and/or deterioration in mental abilities.

4. There exists a need for individual factor/trait analysis including those of depression, hypochondriasis, emotional stability, maturity level, interpersonal relationships, chronic invalid role, self-esteem, sensitivity to secondary gain, stress/anxiety levels, malingering behaviors, social maladjustment, somatic complaints, pain involvement, conversions reactions, authority conflicts, adjustment reaction to adulthood, and/or possible family problems.
5. Behavior observation/worker characteristic information is needed, including the individual's attitude and cooperation, best effort, motivation, exaggeration/minimization of situation, ability to tolerate pressure, ability to comprehend and follow instructions, ability to relate appropriately to others, and/or ability to perform simple/complex tasks.

The work sample phase of our triadic assessment may be administered as either the second or final stage of the process. The decision as to the proper time to administer work samples will be based primarily on the quality and quantity of background medical information, the nature and degree of the client's impairments, and the evaluator's knowledge and understanding of the client's restrictions as it relates to the physical demands of jobs. In any case, the work sample phase would not be embarked upon until sufficient information had been accumulated (through background information, the initial interview, psychometric testing, etc.) to equip the evaluator to select work samples appropriate for the client. In other words, the work samples are not to be administered randomly or indiscriminately, but should be selected on the basis of the client's needs, interests, and abilities/limitations. In addition, those work samples which will provide the types of information needed by the vocational evaluator should be selected. (Nadolsky, 1971)

Certainly, the standardized work sample has provided an important vehicle for gaining vocationally relevant information for many years. Their use plays an especially important role in the vocational assessment of the industrially injured worker. First, many individuals within this population (particularly unskilled and many semi-skilled "blue collar" workers) may not relate well to the "paper and pencil" format typically associated with psychometric testing. As defined in the VEWAA Glossary (VEWAA Glossary Committee, 1983), a work sample is "a well defined work activity involving tasks, materials and tools which are identical or similar to those in an actual job or cluster of jobs." This performance based, "hands on", experience with work samples provides a practical situation with which the industrially injured worker can usually identify readily.

For the adult client with prior work experience, the work sample can be very useful in evaluating whether the individual retains the ability to perform previous work skills or has lost that ability. When a determination is made that the client cannot return to a former occupation (or related job), the work sample becomes an important tool in assessing the injured worker's capacity and capability to acquire new work skills. In addition to the evaluation of specific work skills and/or more global worker traits, the work sample provides both the evaluator and the client the opportunity to observe and consider work behaviors and characteristics, client interests, and motivation. While working with an industrially injured population, these issues and concerns are particularly important for making appropriate recommendations and/or developing a realistic rehabilitation plan.

It is important to recognize that the work sample "experience" is often the injured worker's first real opportunity to view himself and learn about his "post-injury self" in relationship to work. Every effort should be made to make this a positive experience, and again, the selection of appropriate work samples is important. Specifically, an effort should be made to select work samples that will both challenge and interest the client in order to engage his/her motivation and best effort. In doing so the work sample "experience" will be maximized in terms of the work performance demonstrated and accuracy of information received regarding abilities and limitations.

Finally, work samples are designed to assess the behavior and abilities/-limitations of an individual as related to the basic duties, equipment, and tools of a particular occupational area within a controlled environment. (Nadolsky, 1971) Ultimate success in relating the client's performance on work samples to performance in the actual work place will depend primarily on the experience and knowledge of the evaluator regarding the client's abilities/limitations, as well as the knowledge of specific job requirements and employer expectations.

The final portion of the triad consists of the work capacity evaluation (WCE). To define the meaning of work capacity evaluation, this writer shall use the definition provided by Dr. Leonard N. Matheson, Ph.D. in his manual, Work Capacity Evaluation, in which he states that the WCE is "A process of measuring and developing an individual's capacity to dependably sustain work performance in response to broadly defined work demands".

There is a definite correlation in our situation between measurement and development as it relates to the WCE. We try to look at the individual from the standpoint of capacity at the time of performance and to gain insight related to potential work capacity as indicated by our measures. The demands of the WCE can be placed at many levels ranging from light to very demanding or in many cases from vocational classification, the heavy type of work situation.

Like any good vocational evaluation process, it begins with the vocational evaluation plan. Our basic concepts of the components of this portion of the assessment include:

1. Feasibility for rehabilitation/ employment
2. Work capacity evaluation devices
3. Work tolerance screening - short term
4. Work capacity evaluation - long term
5. Work hardening
6. Vocational recommendations.

The question of feasibility for rehabilitation and/or employment is a measure that is part of the total rehabilitation process. We use questions of employability and skill acceptability to an employer.

Through the addition of this measure, we can gain further insight related to individual/productivity and knowledge of safety in the work place, and also gathering information about the individual's interpersonal behaviors in a multidimensional process. Behaviors and worker characteristics can be identified from either a positive or a negative standpoint.

The physical capacity evaluation is also an effective measure for building communication between a rehabilitationist and the rehab client. It helps us to gain information that will be important for further treatment, information that will be important to an employer, and information that can be verified through observation.

Determining whether an individual is ready for rehabilitation or employment is something that cannot be overstated. We are all aware of many cases where people were referred for services or employment with no knowledge of need or capacity. The work capacity evaluation process is just one more building block related to good rehabilitation processing and positive outcomes.

The work capacity evaluation devices used include the WEST 2 and WEST 4 as manufactured by Work Evaluation Systems Technology of Huntington Beach, California.

The WEST 2 is a multi-purpose work capacity evaluation device which provides measurement of whole body range of motion under load. This device also aids in the simulation of work demands including postural tool usage when adapted and used with WEST 4. It provides information pertaining to worker safety and the proper use of body mechanics as well as symptom control techniques. Like many other of the evaluator's tools this work device is categorized using the standards of the U. S. Department of Labor.

The individual is allowed to work at various levels and weights depending upon their individual ability and capacity. The ranges of motion pertaining to each level and load are measured and reported by the evaluator. Specifics pertaining to symptomatology and pain, etc., are identified along with worker characteristics.

WEST 4 is a work capacity evaluation device used to measure upper extremity strength and fatigue tolerance. It also assists in the measurement of the ability to utilize hand tools and upper extremity work capacity. Torque and grip strength are important in this process as an actual work situation.

The individual works with wrenches and nut drivers in various positions with the evaluator adjusting the torque of the device. The specific measure is stopped at the point in time when the evaluee can no longer use the specific tool. Torque and grip strength is subsequently measured at this level.

Work tolerance screening is a part of the work capacity evaluation. This is used to evaluate the person's capacity to perform work over a specific period of time. This is used in situations where a static rather than dynamic measure is needed and the information provided is integrated into a full scale profile developed from the three segments of the total evaluation program.

As part of the process, the physical and psychological work performance factors are measured and the demands of the work situation are identified. The pace at which an individual works is also important in this process and gives us a baseline as it pertains to an individual's progress and assists us in predictive measures.

The work capacity evaluation-long term is the dynamic process built from the work tolerance screening. By having the evaluee participate in specific measures over several days, we are in a much better position to determine what a person is capable of doing and measure the person's capacity to sustain work activity. Once the building blocks are initially laid, we are capable of looking at the individual in terms of positive or negative gain.

Work hardening as a part of the rehabilitation process is certainly nothing new. We use the work capacity evaluation and work tolerance screening in a manner to allow consistent positive growth. By developing and using the work capacity evaluation materials the ORC interdisciplinary team can make an effort to re-condition the injured party over the period of time designated in initial planning. Outcomes from this portion will hopefully allow the individual to condition himself to work activity and to be able to sustain activity without undue fatigue and/or pain.

In conclusion, we are interested in measuring the critical work demands in this phase. As professionals involved in vocational measurement and planning, we must assess those problem areas which produce symptoms that limit work tolerance. Through observation and feedback we can determine the individual's ability to dependably sustain work activity over a period of time. This assessment, under load, assists the individual and the evaluator to make the best possible determination of vocational choices/needs.

By combining all three phases in this triadic approach we, as rehabilitation professionals, can, from a physical/psychological standpoint, profile the person by impairment, functional limitation, feasibility for certain work activities, potential employability and earning capacity. Taken together, these rehabilitation processes help us place the realities of physical activity and actual work in perspective.

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# VOCATIONAL ASSESSMENT OF "CHRONIC PAIN SYNDROME PATIENTS"

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**ABSTRACT:** Vocational rehabilitation counseling as an integral component of a multidisciplinary pain management team has been a relatively recent development (Tuck, 1983). Due to this expansion in "Chronic Pain" treatment, a logical extension of vocational rehabilitation service provision is to include an accurate and valid vocational evaluation of the individual when appropriate. It is this author's position that to increase the probability of a successful return to work, vocational evaluator skills are necessary to determine an appropriate match of client to job.

The absence of research and descriptive literature regarding the role and function of vocational evaluators with this population was unforeseen. Therefore, the purpose of this paper is to describe this population, its' behavioral characteristics and vocational evaluation strategies that appear to be effective.

## Description of the Problem and Treatment

Modern medicine has been unable to alleviate chronic pain. Therefore, these patients appear condemned to a life of pills, decreased activity levels, strained family relationships and financial dependency. The National Institute of Health estimates the health care cost of chronic pain at $40 a day per person which totals approximately $14 billion dollars a year. This makes chronic pain a prime concern.

Low back pain cases, one of the most prevalent psychophysiological disabilities, are the most frequent to appear in vocational evaluation units. In California, only 15 percent of workers' compensation claims are for low back pain, but these claims account for a staggering 85 percent of that state's total annual workers' compensation medical budget. Consequently, significant efforts in research and service provision are needed to help this population regain personal, social and financial independence.

Chronic benign pain syndrome is pain of greater consequence than organic findings would indicate or pain which has outlasted the initial degree of pathology (APA, 1980). Most common is low back syndrome and sciatica (Stanbach, 1974 A & B). Several factors appear to influence not only the source of chronic benign pain, but also to serve as behavioral reinforcers of the syndrome. These factors include the patients's socio-cultural background, family system, intrapersonal self-reinforcement, pre-existing psychopathology, secondary gain neuroses, work dissatisfaction, inappropriate medical intervention, negative financial incentives and litigation. Awareness of these factors is essential for vocational evaluators. Intervention strategies do not appear to be the role or function of the evaluator. However, if these factors are not included in the overall rehabilitation plan, the chances of a successful return to work are significantly reduced, regardless of the accuracy of a vocational evaluation.

Persons experiencing chronic pain express their pain in a variety of ways. Visible and audible signals of pain experience are common. Guarded body movement, spasms, awkward gait, gasping and moaning are often observed. Many times, these behaviors effect the accuracy of a vocational evaluation. Making consistent observations of these behaviors during the evaluation process increases the perception of disability and consequently decreases the availability of appropriate vocational options. The vocational evaluator's challenge is to determine the readiness of the client for service and make necessary intervention recommendations.

Pain in the absence of organic pathology, appears to be a habit which can be learned. Reinforcers of pain seem to be:

1. Pain behaviors that receive direct and positive reinforcement.
2. Pain behaviors that receive indirect but positive reinforcement by avoidance of perceived noxious consequences or time-out from unpleasant activities.
3. Activity or "well" behaviors go unrewarded or are punished (Budynski, 1973; Fordyce, 1974 and 1976).

Fordyce and Roberts believe that pain clinics based in rehabilitation settings, with an emphasis on increasing physical activity, instead of a psychiatric setting, with its implications of emotional involvement, plays an important and positive role in shaping patient expectations and modifications. Most pain clinics feel that pain is what one feels when one hurts. The question is not, "Is it real?" but "What are the factors that influence or control the pain?"

Virtually every body function, including pain, is subject to the influence of learning or conditioning. Pain problems do not begin because of learning, but may come to be maintained or controlled by learning factors. If learning has occurred, unlearning can also occur.

A common treatment strategy is to ignore any verbal or physical sign the patient makes to indicate pain. Also, the staff is trained to praise behavior unrelated to pain. The emphasis of treatment is placed on increasing physical activity through exercise. It moves the patient from what is said about pain to what is being done about it.

Other common components of chronic pain programs appear as varied as philosophies toward treatment. The majority of pain clinics use a multidisciplinary team staffing approach. This may include a psychiatrist, physical therapist, and psychologist on a clinic staff or be more varied with a physician, psychiatrist, psychologist, physical therapist, occupational therapist, dietitian, relaxation therapist, family therapist, social worker and vocational rehabilitation consultant forming the staff. In order to be effective in treatment, each program must place emphasis on communication between all parties involved in the case. This requires unique awareness skills from vocational rehabilitation specialists. They must be able to be a motivator, disability evaluator, legal expert, patient advocate and referral agent.

More specific implications for the rehabilitation practitioner include the ability to identify pain as the major reason for disability, the ability to reinforce appropriate physical activity, and the ability to focus efforts on what the client does about pain rather than what is said about pain.

## Strategies During Vocational Evaluation

Industrially injured workers suffering from chronic pain are the commonly referred pain patients receiving vocational evaluation services. It is important for the vocational evaluator to realize that feelings of distress such as anxiety, depression and alienation are factors in industrial injury (Larson and Spritzer, 1977; Levi, 1979), and such stressors may well precipitate and maintain chronic pain behaviors following a relatively minor injury. It is quite common to find chronic pain patients who were facing layoffs at work or who disliked their pre-injury occupations.

Closely related to work dissatisfaction are negative financial incentives. Financial payments for disability have been widely held to delay recovery and rehabilitation, thereby serving as powerful reinforcers for chronic pain syndrome (Better, Fine, Simmson, Doss, Walls and McLaughlin, 1979; Eaton, 1979).

Work dissatisfaction and negative financial incentives appear to be the most significant barriers to re-employment that the vocational evaluator must contend with for this population. Historically, vocational evaluation clientele have unrealistic occupational goals, lack occupational awareness and poor decision making skills. Therefore, the primary skills of vocational evaluators are on target for an accurate assessment of vocational options with this population.

A short term vocational evaluation was described as including six steps (Botterbusch, 1983). These steps are:

1. Review Case
2. Referral Questions
3. Select Evaluation Techniques
4. Intake Interview
5. Plan Modification
6. Exit Interview

This short term process will serve as a good model with the chronic pain population due to its need for specific referral questions and allowance for plan modification. Each of these steps will be reviewed with chronic pain patients in mind.

## Review Case

Upon receiving referral information, the vocational evaluator should identify medical and psychological reports describing the condition of the client. Close attention should be paid to any physical restrictions placed on the client by the physician. These physical restrictions are the basis for discrepancies in physical activity displayed by the client during programming. Again, remember the premise in chronic pain treatment is what the client does, rather than what he says.

If the client has participated in a chronic pain treatment program review the discharge report. This information may give insight as to specific pain behavior patterns. As always, if you have further questions, a telephone call may be beneficial to your evaluation planning.

## Referral Questions

A common problem for vocational evaluators is the lack of specific referral questions. When this occurs, incomplete evaluations or inaccurate results are generated. Be sure to communicate with the referral source prior to beginning the evaluation to assure comprehensiveness and accuracy. Returning the worker to a previous job appears to be current priority. Therefore, many referrals for vocational evaluation are to determine if that is appropriate. Be sure this is clarified prior to initiating the evaluation.

## Selection of Evaluation Techniques

Vocational evaluation is and can be a very stressful experience for our clientele. There are indications stressors exacerbate pain symptoms. Therefore, careful selection of evaluation tools is of high priority. Initially, an acceptable process allows the clients to select their preference of evaluation tools. This will lead to more commitment effort and follow-through on their behalf. Once a relationship has developed between the evaluator and client, alternate techniques can be applied.

The selection of evaluation tools should also offer the opportunity for extended observation periods. When tools are of short duration, inconsistency in stated activity levels and observed activity levels are not obtained.

### Intake Interview

Intake interviewing is a very individual skill. Each evaluator should continue to capitalize on their unique style. However, very specific information should be obtained. An outline to be incorporated into your informational and stylistic needs follows:

A. Clients Work History
  1. Minimum of last three jobs (15 years)
  2. Specific job titles and duties
B. Description of Accident/Injury
C. Perception of Disability
D. Awareness of Employability
E. Present Family Situation
F. Financial Implications Since Injury
G. Explanation of Evaluation Process

Gathering this information helps to develop a working relationship and provides the evaluator with insight to the motivation level of the client.

### Plan Modification

Probably the most important component of any vocational evaluation is flexibility. During the evaluation, alternative occupational tasks are developed and require assessment. Also, evaluation termination may occur for a variety of reasons. Therefore, each vocational evaluator must be flexible in scheduling. Appropriate timing of the evaluation and maintenance of motivational levels is essential to obtain an accurate and valid vocational evaluation.

### Exit Interview

The final staffing, or exit interview, is the catalyst for a successful return to work. Due to the complexity of the cases within this population, networking and communication are very high priorities.

All individuals significant to the case should be invited to attend. Included in this group are the clients' family members, attorneys, insurance representatives, pain treatment staff, referral counselor and previous employer. The goal is to review evaluation results and make vocational recommendations. Obtaining mutual agreement and support from all involved is the objective of inviting all significant others. Many times this is not possible, but when it occurs, chances for a successful rehabilitation outcome increases.

### Summary

Chronic pain syndrome patients will likely increase in numbers over the next decade. With recognition that the skills of rehabilitation professionals can be used to return them to gainful productive activity, an increase in referrals should also occur. Further research is needed in this area to provide documentation of success. It is this authors' contention that returning the client to work will be a component of future chronic pain program models.

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# VOCATIONAL ASSESSMENTS OF PSYCHIATRICALLY DISABLED PROFESSIONALS

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**ABSTRACT:** The onset of psychiatric disability in middle life and its disruption to the careers of professional women and men has not been adequately addressed in the psychiatric rehabilitation literature. Each year thousands of individuals become victims of major affective disorders or psychotic illnesses causing manifold deterioration to their functioning as successful physicians, dentists, lawyers, teachers, nurses, etc.

Vocational assessment becomes a crucial service for these victims of mental illness. At McLean Hospital, a private non-profit psychiatric hospital affiliated with Massachusetts General Hospital and Harvard Medical School, the Rehabilitation Services Department has been working on a series of standardized tests, simulated vocational experiences and rehabilitation counseling techniques to determine feasible occupational alternatives to these former well-established professionals.

This presentation will highlight the vocational assessment process by illustrating in depth three professionals admitted to the hospital and their subsequent outcomes.

This paper will attempt to identify some major themes, problems, resolutions and outcomes of three professional people who became mentally ill in their adult years. The vocational assessment process in each case developed along unexpected lines and directions, mainly due to the severity of the illnesses and the unique psychological make-up of each patient.

Botterbusch refers to six critical areas when evaluating disabled persons. He begins with a complete case history that consists of personal, education, employment and medical histories plus a description of present activities. Next, he identifies physical and psychomotor capacities, underscoring the importance of quantifying physical capacities as much as possible using accepted DOT definitions. Academic achievement, aptitudes and vocational interests comprise areas three, four and five. His last category for consideration is entitled psychological and emotional stability. This he identifies as the most subjective of the six areas and therefore, the most difficult to evaluate.

Indeed, assessing the functional capacities of formerly high-level professional dentists, doctors, lawyers and research chemists after they have experienced the dramatic onset of a major affective illness or psychotic decompensation becomes a process of relative objectivity in relation to the subjectiveness of emotional and psychological stability.

McLean Hospital, a private non-profit psychiatric hospital is located in Belmont, Massachusetts, a suburb of Cambridge and Boston. It was established in 1811 by the Massachusetts General Hospital Corporation and maintains a close affiliation with the Harvard Medical School. As a teaching and research center, McLean services patients from many parts of the world and often receives referrals from private psychiatrist who treat professionals from all disciplines in academia and corporate structures.

At the time of my initial contact, Dr. A. had been previously hospitalized on three occasions dating back to nine years. His initial age of onset was twenty-eight. At that time, he was serving in the U.S. Navy, becoming grossly psychotic aboard ship on his way to Viet Nam. His mental status on admission to the U.S. Public Health Hospital was one of confusion, rambling, non-sensical talk, fearfulness and loose, unintelligible thoughts and speech. He was treated with anti-psychotic medication, electro-shock therapy and recompensated fairly quickly. He received a medical discharge from the Navy, went into practice as a dental associate and soon opened his own practice. Despite on-going pharmacological and psychotherapies and two subsequent hospitalizations, he continued to practice, receiving a great deal of support from his sister who doubled as his office administrator. When his sister married and had her first child, leaving Dr. A. for a maternal leave of absence, he exhibited strange behavior in the office. He was abusive and inappropriate to his patients, inconsistent with his appointments when he was able to keep them and gradually decompensated to the point where his parents called the police to admit him involuntarily into McLean Hospital.

His course of hospitalization was highlighted by medication changes and alterations to respond to his manic-depressive fluctuations. Psychological and neuropsychological assessments revealed full scale I.Q. between 90 and 95, memory function in the borderline to dull normal range, severe cognition dysfunctioning in the areas of concentration and task maintenance and an inability to reliably produce a three step motor program. His CT Scan revealed a minor abnormality reinforcing the neuropsychological results of cortico dysfunctioning in the frontal and temporal lobe area.

His mental status during this period indicated that he could not tolerate ten minutes of sustained vocational exploration due to preoccupation with his bowel and bladder control and his overwhelming embarrassment and fear of being any distance from a bathroom. In addition, he was obsessed with the effects of the medication on his life. He would complain endlessly about his inability to resume his practice yet acknowledge the current realities of his debilitated state. Another major theme of our meetings was his ever-present frustrations in relation to his social life.

Much of his attention was legitimately diverted to his body because of the medications he was taking. Periods of blurred vision, finger and arm tremors and leg trembling contributed to his inabilities to sustain concentration and produce activity of any nature. His attempts to receive greater disability benefits from the Veterans Administration added to his frustrations to the point of applying to Social Security for disability assistance. In December of 1983, he was denied benefits and a secondary appeal application was made with this writer summarizing the above-stated information with this concluding statement, "Dr. A.'s attention span is severely limited as he is unable to focus on constructive work activities outside of his own bodily needs. I am very pessimistic about his prognosis to return to his dental practice and currently feel that he is limited to the minimum functions of activities of daily living."

Dr. A. received approval of his appeal application in February, 1984. He continues in a community mental health center day treatment program five days per week and is maintained on Lithium Carbonate and Tegretol.

Dr. B. was born in 1931 in Brooklyn, New York, the older of two boys to a hard-working garment cutter father and a chronically ill mother with long-standing cardiac and diabetes problems. Mother died in 1960 at age 50, and father, described by the patient as "a rigid and difficult man" died in 1973 from a cerebral vascular accident.

The patient was educated in the public school systems of New York. He described himself as having a small group of friends, participating on the soccer team and being involved in the school's sound system programs and achieving B grades. He went on to Adelphi College as a commuting student which he said he enjoyed. He met his future wife in his sophomore year, graduated in 1952, and married in 1953. He worked for the atomic Energy Commission for one year and then was drafted into the army. In 1956, he returned to the A.E.C. and enrolled in the graduate program at Rutgers University. In 1958, he began his work at Bell Laboratories in Reading, Pennsylvania, rising from physical chemist to project engineer in charge of the measurement laboratories. He published a variety of technical papers and presented twice yearly at scientific meetings. He was in good health during this period, describing himself as a highly-regarded professional by colleagues, a competent loving husband and father of three daughters, spending summer vacations at Myrtle Beach and living the good life until 1974. At that time, six months following his father's death, Mrs. B. reported that her husband became depressed, staring into space in the livingroom. He saw a psychiatrist who treated him with Lithium and antidepressants without much effect. In December 1984, he was admitted to the Reading Hospital, receiving eleven electroshock treatments. He improved considerably, returned to work but was confused and at times disoriented in his location and what he had been doing. In 1977, he was readmitted to the hospital for inappropriate behavior, grandiose thinking, confusion and disorientation. His thoughts were racing, and he spent large amounts of money in shopping malls purchasing dozens of pairs of underwear and shirts. Bell Laboratories terminated his employment in 1978 with a disability pension of $6000 per year. He was hired a year later by Digital Equipment Corporation, moved to Massachusetts and was able to function tentatively for one year before another manic episode hospitalized him. Digital kept him on their books for another year and finally dismissed him. At this time, Mrs. B. began talking about separation and divorce, feeling she could not cope with her husband's ups and downs and periodic bouts of verbal abuse.

My introduction to Dr. B. was in September, 1982. He was referred for vocational assessment. He presented himself as a quiet, rigid, forlorn man of fifty-two years of age and out of work for a year and a half. His inability to attend to issues of work readiness and focusing on alternative career directions using his years of scientific experience was patently evident. His posturing, inarticulate speech and loose thought processes suggested the need for hospitalization evaluation. Within the next week, Dr. B. was an inpatient at McLean Hospital.

I've been following Dr. B. for two years now. His life course has taken a dramatic downward spiral alternating between two inpatient hospitalizations, marginal independent living, separation from his wife and children, barely managing his daily activities, contracting diabetes mellitus, and his attempt to function in a sheltered work program where his attention span and memory cannot negotiate simple two task operations. Today, he receives Social Security Disability Insurance, participates in a psycho-social rehabilitation program and lives alone, by choice, in a near by community. His one-time ambition to return to scientific work has ceased to be an active issue. It has been replaced by the agony of living with a disease that is unpredictable, causing him day-to-day changes in mood and functioning. The initial question at referral has changed from "what alternative careers are open to Dr. B? to "How can Dr. B. maintain a life for himself outside of a hospital ward?"

Dr. T., a forty-five year old successful dental surgeon was referred to me following his six month hospitalization for a major depression with psychotic features. His admission was precipitated by a suicide attempt of self-inflicted knife wounds to his neck and abdomen. Our first meeting was highlighted by Dr. T.'s determination to "get out of dentistry", his agony of going from his kitchen to the office each day (the office was part of his home) and the on-going frustration of not accomplishing "anything worthwhile" in his practice. He had begun the initial work of putting the practice up for sale and was seeking assistance to change careers. My usual course of assessing vocational potential consists of the administration of the Strong- Campbell Interest Inventory, the Forer Vocational Survey and the General Aptitude Test Battery along with a series of interviews wherein a complete history of personal, education, employment, and medical information are formulated. Dr. T.'s interest scales revealed a high affinity to the human services, medical services and scientific careers. Psychologist, social worker, college professor, minister, optometrist were "very similar" in the Strong-Campbell Inventory. Dentist was low on the "similar" scale. The Forer revealed attitudes of perfection and very high needs for recognition by authority figures in the performance of work responsibilities.

The most revealing data from the evaluation process, however, were found in his personal and educational history. Dr. T. recounted his high school experience with a guidance counselor who suggested a number of options for career directions including teaching and dentistry. He reported this information to his parents and remembers mother clearly deciding that dentistry was the route to follow. Being a dutiful and loving son, he pursued this path in undergraduate school, despite repeating a chemistry course. He was able to enter the University of Pennsylvania School of Dentistry after his junior year at Trinity College and received his D.D.S. in 1963. He was married in his last year of dental school, served in the U.S. Army for two years and returned home with his young family to setup practice in a suburban town not far from his hometown.

He established himself as a leader in the community, serving on the town counsel and school committee. In 1975, he began to acknowledge long-standing feelings of personal inadequacy and unhappiness. His younger son was experiencing major learning problems in school and behavioral problems at home. His response was often tyrannical and heavy-handed, complicating family relations that spilled over into his work life. He sought treatment for his growing depression, receiving both psycho and chemotherapy. At the age of 42, his mother died and Dr. T. became more debilitated. One year later, he made the suicide attempt. As we reviewed his vocational assessments in light of the strong psychological component surrounding his parents influence, particularly mother's perceived power and control on choosing dentistry as a career, "throwing the baby out with the bath water" became our focus. Through a detailed analysis of this work history, especially his military experience, a major theme came to the surface. He recalled his strong positive feelings of working closely with colleagues, sharing cases and collaborating on difficult patients. In addition, his team leader was remembered with fond memories mainly for his choosing Dr. T. as his second in command assisting in teaching rounds and clinical presentations. As we followed this theme into his practice, it became clear that Dr. T.'s very real needs for approval and validation of his work and more importantly, of himself, were not being fulfilled by his solitary dental practice. Despite an active membership in dental societies, he persisted in feeling a huge void in his "worthiness to his patients."

Over a six month period, the clarification of his personal needs versus his professional skills became more separate and discrete. His psychotherapist and I met frequently to compare notes since both themes were so enmeshed. Dr. T. began the process of considering teaching as an alternative career, speaking to local schools of dentistry and dental hygiene. He also pursued the options of group practice, looking into the "shopping mall" setups.

I'm pleased to report that just this past week, he became associated with a practice in his old hometown with a senior dentist he has befriended over the years and respects a great deal. Naturally, he is anxious but with his new insights into himself, his stronger alliance with his wife and children and his greater zest for living, the future looks bright.

These three cases, I believe present future studies in vocational assessment with many challenges. To return to Botterbusch, if psychological and emotional stability indeed are the most difficult areas to evaluate, perhaps neuropsychological testing should hold a more important place in the assessment process of mental disability cases. Both Dr. A. and Dr. B. suffer from Manic-Depressive Illness. Current research centers almost exclusively on brain functioning, specifically in biologic, electronic and neurologic chemistry. The introduction of Lithium Salts as a major treatment for this disease has been boon for sixty to seventy per cent of it victims. However, Dr. A. and Dr. B. have not been fortunate enough to respond favorable to this state-of-the-art treatment. Their lives currently are a shadow of their former selves. Similar to victims of other chronic diseases, they wait and hope for new discoveries to come forth from the laboratories.

For Dr. T., Botterbusch's emphasis on a complete case history plus the opportunity for extended vocational counseling provided important data for the assessment process to move forward in discovering vital personal information that affected his vocational functioning.

In summary, vocational assessment for victims of major mental illness need to keep pace with contemporary psychiatric research findings. Today, greater numbers of young, professional adults, both male and female are being treated for affective disorders. Through careful review of the six critical areas of vocational functioning and an increased sophistication in the assessment process, hopefully more clients will be able to assume lives of productivity and worth.

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# A REAPPRAISAL OF VOCATIONAL EVALUATION FROM AN ECOLOGICAL SYSTEMS PERSPECTIVE

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**ABSTRACT:** This article will present a critical review of the practice of vocational evaluation from an ecological systems perspective. The intent will be an integration of both areas leading to a new model of the vocational assessment process. A description of traditional practices of vocational evaluation will be followed by an overview of emerging system approaches. Issues of environmental resources, vested interests, and bias will be discussed along with potential alternatives, their implications, and systematic tactics for application.

Vocational evaluation grew out of a traditional psychological approach which emphasized one to one contact in a therapist's office and located the source of distress within the individual. Stubbins (1982) expressed concern that use of the traditional model by rehabilitation psychologist presented consideration of the ecological aspects of disability. Galvin (1983) noted that the clinical attitudes in rehabilitation fail to address the personal, social, and economic problems of disabled individuals. Stubbins (1983) recommended a systems approach which looked at behavior from the perspective of individual interaction with the environment.

Stubbins' (1983) suggestion parallels trends in the clinical literature (Seidman, 1983; Jeger and Slotnick, 1982; Schleser and Rodick, 1982; Rappaport, 1977) which reflect movement away from the traditional clinical model to an ecological systems perspective. Ecological system perspectives stress the interaction or "fit" between the person and the environment. Individual human behavior is seen as a function of the mutual interaction of various sub-systems (e.g., physiological and psychological) and supersystems (e.g., family, medical, community). Dysfunctional behavior results from faulty interactions within or across systems.

Van Bertanlanffy (1968) defined a system as a complex set of components which interact in a predictable manner, are hierarchically related, and can be found in all areas of nature. Human beings can be thought of as a system composed of atoms, cells, and organs. In turn, the complete human organism can be seen as a simple component of a higher order system (e.g., family community). Changes within any component of the system affects the entire system and a range of systems in the hierarchy.

Seidman (1983) noted that an implication of a system approach is the recognition and varied effects of stakeholders or individuals with divergent values, cultural backgrounds, roles and vested interests. Definitions of and solutions to problems must be based on a synthesis of key stakeholders to assure long term change. Systems approaches have been utilized in community mental health by Jeger and Slotnick (1982), in family therapy by Schleser and Rodick (1982), and in medicine with Engle's (1982) proposal for a biopsychosocial model.

## Vocational Assessment

An essential element of the rehabilitation process is the determination of individual capacity for work (McGowan, 1969). Vocational evaluation provides a significant source of information for such a decision. The practice of vocational evaluation consists of a comprehensive process involving in part the systematic utilization of real or simulated work situations to assess vocational potential. Sources of data include medical status, psychological adjustment, social skills, vocational history, educational level, cultural background, and economic factors (Tenth Institute of Rehabilitation, 1972). Common assessment techniques, such as psychometric testing, work samples, situational assessment, on the job evaluation (OJE) and on the job training (OJT), provide a means for individual or group measurement of vocational interest, aptitude, and behavior within simulated or actual employment settings. The issue is whether vocational assessment provides appropriate data for accurate vocational appraisal.

Gellman (1968) identified four goals of vocational evaluation. The main goal was the provision of data contributing to vocational development for successful rehabilitation. A second goal was an indication of future work behavior along with a prediction of the nature and extent of vocational development. Third, vocational evaluation should specify behavior patterns in various work situations. Finally, the evaluation should result in the preparation of a treatment plan. Although vocational evaluation provides a means to collect, process, and act upon vocationally relevant information about an individual, it relies on a limited approach regarding determination of ability to work. Gellman's (1968) primary goal of providing vocationally related information doesn't address the work place, availability to work, or incentive to work. Vocational evaluation may encourage earning money to become independent but it does not consider the financial hardship of forfeiting disability insurance and beginning employment at a lower income rate. The previous limitations should not detract from the general value of vocational evaluation and its necessity in the rehabilitation process. Rather they should enlighten practitioners and consumers of areas requiring further refinement.

## Ecological Systems Perspective

An ecological systems approach explains behavior as a multisystem interaction involving the individual, family, school, occupation, and society. The defining attribute consists of concerns with effective coping strategies, through the development of strengths, instead of focusing on maladjustment or pathological conditions (Jeger and Slotnick, 1982). The ecological systems perspective encompasses three areas. Cultural relativity demands that individual differences be viewed from their cultural context. Diversity requires respect for personal discomfort. Finally, person-environment fit concentrates on the identification of key variables which contribute to the best adjustment between the person and the social/physical environment (Rappaport, 1977).

Several implications emerge out of the ecological systems perspective. First, behavior can best be understood only be assessing how individuals interrelate with their environment. Second, identification of the systems most important and most troublesome to the individual must precede any effective intervention. Third, faulty interaction between a person and the environment leading to adjustment problems can be modified through competency development.

An ecological system approach differs from a traditional rehabilitation perspective by placing emphasis on showing people how to acquire the necessary, social, political, or psychological resources to improve their condition as opposed to provision of treatment and services. As a result rehabilitation may foster an attitude of personal dependence instead of offering a catalyst for individual responsibility. The key point from an ecological systems perspective for vocational evaluation is the incorporation of the three areas of relativity, diversity, and person-environment fit as an operational philosophy towards the disabled.

## Integration

Vocational evaluation viewed from the ecological systems perspective takes on new emphasis and depth. The ecological viewpoint, stressing proper fit between a person/setting, can serve as a validity criterion by identifying the content appropriate for assessment. One example from this perspective is the increasing reliance on environmental measurement. However, often neglected areas include blame, decision-making, and the predominance of a clinical attitude.

### Environmental Assessment

Environmental assessment is critical for the assurance of maximum person--environment fit. Situational assessment, OJE/OJT, and labor market surveys are current examples of measuring proper adjustment. Job analysis provides one of the best examples of measuring environmental characteristics for a particular job. But these examples are not enough. Other factors such as accessibility, public transportation, and employer/employee attitudes must be part of a thorough environmental assessment.

### Blame

One potential criticism of vocational assessment is the tendency for the attribution of blame based on personal deficit. Individuals with disabilities may unconsciously be viewed as responsible for their disability or the conditions maintaining it. Ryan (1976) described this rationale as "Blaming the Victim." Well meaning individuals attempt to justify inequality in life by searching for deficits in the actual victims of inequality. He felt the process occurs due to conflict of self-interest. The solution is to blame problems on the past experience of individuals instead of inequality and then offer solutions through social programs. The result is a diversion of attention from and avoidance of the actual source of the problem.

In a sense, rehabilitation functions in a victim blaming mode because its central purpose is the provision of services for amelioration of disability related deficits of a physical, social, or emotional nature. However, the goal of increased self-sufficiency helps one break out of the deficit cycle. The danger from a vocational evaluation position is to view the problems of a disability solely of individual origin. As Stubbins (1982) noted, "the natural way of studying disability and the way adopted by virtually all rehabilitation professionals is to locate the problems in the client" (p. 14). Reliance on blame allows procedure failure to be shifted from the evaluator to the alleged personal weakness of the client.

Alternative to this situation involve a change of perspective. Vocational evaluators must realize the multideterminant nature of problems associated with disability. Second, periodic self-evaluation is needed to separate client interest form self-interest and to determine attitudes towards the source of client adjustment problems. These goals could be accomplished through education, peer groups, self-help groups, and role playing.

**Decision-Making**

Another concern is the neglect of socio/political and self-interest variables in decision-making. Stubbins (1982) felt a reason for this is that students are indoctrinated with the belief that institutional goals are compatible with helping roles. They then expect to meet disabled individuals in a social context free of the influence of political-organizational pressures.

Rappaport (1977) has observed that science and scientist are affected by social forces mediated through personal values and beliefs. As a consequence, the collection of supposedly empirical facts as well as their application are directly influenced by culture and values. The emergence of rehabilitation reflected a variety of trends. Initial emphasis on services for World War I veterans was extended to civilians followed by emphasis on the blind. Legislation in the 1970's created the definitions of developmental and severe disability. The point is to acknowledge the effects of the socio-political sphere of influence on public social policy.

The previous discussion dealt with political/social influence in rehabilitation on a global scale. However it is also found in the assessment process. In a qualitative study on the vocational evaluation process, Murphy and Ursprung (1983) used the term "politics of evaluation" to describe the phenomenon that decisions are a function of clinical judgement as well as an awareness of the consequences for one's career and within the professional community. The authors reached several conclusions including that the needs of the agency or professional took precedence over those of the clients, the evaluators seemed to use a devalued and ill defined ideology especially regarding motivation, and both clients and staff shared the same conceptions of their respective roles. The former were to cooperate in a predefined manner while the latter maintained control through interpersonal communication and gatekeeping. Two general implications raised were that commonly accepted terms such as "unmotivated" or "clinical decision" should be carefully examined and that practitioners should pay attention to the social, economic, and professional influence which affects decision-making.

One alternative to increase decision-making is the exposure of vocational evaluators to the reality of social, political, and personal influence on judgement in the rehabilitation process. Desmond (1982) felt such an approach would teach professionals how these forces could provide rather than deny opportunity for individuals with disabilities. A partial impetus could come from self-help and peer groups. Second, vocational evaluators must realize that successful divisions, result from satisfaction of as many stakeholders as possible. Third, evaluators and disabled individuals must learn how to use the socio-political process to their advantage. Attainment of the previous two goals could be facilitated by advocacy training.

**Clinical Attitude**

Stubbins (1982) attempted to analyze the clinical methods in rehabilitation to reveal their foundation in an ideology of individualism. He defined "clinical attitude" as a predisposition towards a model in which individuals come to a clinic to be treated on an individual bases through testing, interviews, and treatment plans. The problem with the clinical approach, according to Stubbin (1982), is that it ignores socio-ecological factors such as federal fiscal policies, business cycles, disincentives to work, and employer prejudice.

One effect of the clinical approach in vocational evaluation is the reliance on job placement as the primary outcome of success. Compliance with a single norm restricts alternatives and encourages poor adjustment. Another consequence of the clinical role is that problems such as stigma and social exclusion might be seen as natural rather than a function of socio-ecological factors. A final point concerns evaluator/client roles. The evaluator is perceived as the all knowing authority figure in direct control of the presumably dependent and compliant disabled individual who possesses minimal decision-making responsibility.

The clinical model can be modified through alternative procedures. Vocational evaluators have shown the capacity for organization by adherence to the clinical approach and a preference for self-interest. What is needed is a change in issues of organization from self-interest to client interest. Second, evaluators must become aware of the various levels of systems such as the individual, family, and community which affect the interaction between a disabled person and the environment. Third, evaluators need to become more flexible in operationally defining assessment goals to avoid stereotyping outcomes by expected behavior or employment. Fourth, vocational evaluators need to relinquish some of their power to disabled individuals an offer them a greater chance for self-development through empowerment.

Empowerment refers to the creation of programs or policies which assist individuals to acquire and control resources which affect their lives (Jeger and Slotnick, 1982; Rappaport, 1978). This method implies present competence or future potential based on opportunity and it would place evaluators in a new role as collaborators rather than experts. The best current example of this thinking is the emergence of Independent Living. This movement seeks to first develop personal responsibility for one's life and second to encourage participation in the daily life of the community (Cole, 1979). The unique element is the minimal reliance on professional assistance and the strong reliance on peers. Initial personal success in Independent Living concerns can serve as a power tactic to demonstrate self-confidence leading to the feeling of self-efficacy.

## Implications

The general theme of the following implications is the call for a new model of vocational evaluation based on the ecological systems perspective. One implication for vocational evaluation is a redefinition of the purpose of the assessment process. The evaluation should be an attempt to match the individual in the best way with the environment based on identification of existing skills and a thorough system assessment, and development of effective coping strategies. Second, the evaluator would now be seen more as a collaborator instead of an expert with primary consideration for client interest over self-interest. Third, the graduate training of evaluators would require curriculum modification regarding definition and application of systems theory, development of advocacy skills, socio-political awareness, and the capacity to recognize professional bias. Finally, a change in attitude and a new source of power would evolve over time. Disabled individuals will realize they have power to take control of their lives regardless of the setting. Vocational evaluators will realize their reluctance to acknowledge socio-ecological factors contributed to their negative view of the disabled as well as constrained their professional growth.

## Summary

This paper was an attempt to analyze the process of vocational evaluation from an ecological systems perspective, discuss the emerging implications, and offer various alternatives. The integration of an ecological systems approach within the vocational assessment process suggested three issues. First, respect for person--environment fit requires greater use of environmental measures. Second, practitioners must be cognizant of the tendency for blame and the influence of the clinical attitude. Third, service providers and recipients must realize that the mechanics of the decision-making process involve a constant interaction of social, political, economic, and self-interest variables.

Proposed alternatives were based on education. A variety of tactics and strategies were described for individuals with disabilities and vocational evaluators. The overall implication of this paper was the suggestion of a new model of vocational evaluation.

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# NEW DIRECTIONS FOR VOCATIONAL ASSESSMENT: EXPANDING THE USE OF SELF-EVALUATION AND WORK CLIMATES

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**ABSTRACT:** Two criticisms of current approaches to vocational assessment are that they (a) limit workers' involvement in the evaluation process and (b) measure work behaviors without regard to work climates in which they occur. Research has shown that work--related behaviors are directly affected by changes in the work climate. Moreover, self-monitoring facilitates behavior change. This paper outlines procedures for using videotape and discussion sessions to assist handicapped adolescents to evaluate the appropriateness of their work behaviors within specific work climates. Benefits include worker insight into some reasons behind their behaviors and easier transition from vocational training programs to actual employment.

Professionals in the fields of vocational evaluation and work adjustment have long contended that the failure of handicapped workers to maintain gainful employment is often a consequence of inappropriate work habits rather than an inability to carry out the technical requirements of a job (Kolstoe, 1961; Michael-Smith, 1950). The literature is replete with strategies for measuring critical work habits (Sawyer & Morgan, 1981; Wright, 1980), but two weaknesses are inherent in many of these approaches.

One criticism stems from the fact that a worker's work habits are usually evaluated by someone other than the worker. This practice subsequently minimizes the extent to which a worker assumes personal responsibility for modifying those behaviors deemed inappropriate for a particular work setting. To get around this problem, workers have sometimes been taught to chart their own behaviors, the effects of which have been praised by a number of investigators (Kelly et al., 1983; Litrownik & Freitas, 1980). Another approach to monitoring behavior has gained popularity, namely videotaping, and results of using it also have been encouraging (Booth & Fairbank, 1983; DeRoo & Haralson, 1971).

A second criticism of many types of vocational assessment is that work behaviors are often little opportunity for the worker to observe and evaluate his/her behavior across a wide gamut of working conditions. Research has indicated that a worker's behaviors are influenced by the task and the physical aspects of the work setting (Lustig, 1970). Yet, work habits are also affected by employer styles and other aspects of the work climate. These include the spatial arrangement of workers in the work area, communication patterns commonly used between the workers and supervisors, and the degree of responsibility allocated to the workers (Friedlander & Greenberg, 1971; Hall & Schneider, 1973; Litwin & Stringer, 1968; Schein, 1978). Organizational development specialists have emphasized these aspects of work climate when helping individuals to understand the importance of work values, norms, and behaviors that may be required for membership and advancement within an organization (Kaye, 1982; Margerison, 1979; Van Maanen, 1975; Wallach, 1983). While elements of work climate have been addressed in a few rehabilitation programs (Gelfand, 1966; Gellman & Friedman, 1965), routine use of work climate variables has yet to be systematized and established as a fundamental component of vocational assessment.

The purpose of this paper is threefold. First, it describes a model of vocational assessment that stresses self-monitoring of behavior through videotaping and individual/group discussion to encourage workers to evaluate personal work habits within the context of different work climates. Second, it presents some impressions of handicapped adolescents and professionals who have used the model. Third, it addresses some of the reasons for the model's success and the significance of using it within various disciplines related to vocational evaluation.

## Description

The assessment model herein described employs a standard five-step procedure. The evaluator initially selects a specific work activity that can be completed by two to four workers (Step 1). This activity might be as simple as an assembly task or as elaborate as a simulated office situation in which workers are required to file, take dictation, and type reports.

Once an activity has been chosen, the evaluator assumes the role of a work supervisor and creates a specific work climate in which the activity is to be conducted (Step 2). The evaluator does this by altering the spatial arrangement of the workers, the degree of responsibility afforded to them, and the communication patterns between he/she and the workers (see Table 1).

Table 1

Dimensions of Work Climates

| Type | Worker arrangement | Degree of responsibility | Communication patterns |
|---|---|---|---|
| Bureaucratic | Hierarchical | Interdependent | Channeled |
| Tyrannical | Isolated | Independent | Negative |
| Supportive | Grouped | Shared | Positive |
| Innovative | Individual | Open | Progressive |
| Laissez Faire | Grouped | Undifferentiated | Sporadic |

If the evaluator chooses to create a bureaucratic climate, for example, he/she positions the workers in a hierarchy. Each worker then is assigned a task which can only be completed after one worker has received input from another worker. Feedback to the workers in initiated only be the evaluator/work supervisor, and it is channeled in only one direction, i.e. down through the ranks.

While the workers and the evaluator are involved in the work activity, their behaviors are videotaped using standard video equipment (Step 3). It is ideal to have a cameraman film the work sessions, but satisfactory results have been obtained by using a stationary camera positioned so that all participants can be seen at the same time.

Work sessions usually last fifteen to twenty minutes. At their completion the workers view the videotape and note specific instances in which they demonstrated appropriate and/or inappropriate work habits (Step 4). Data sheets listing various work behaviors provide the worker with a profile of his/her work performance. They also facilitate his/her understanding of the appropriate work habits for the specified work climate within which he/she was working.

After viewing the videotape and noting his/her work behaviors, each worker participates in an individual or group discussion session moderated by the evaluator (Step 5). The objective of this session is to assist each worker in examining details of his/her behavior and the underlying feelings which accompany them. Questions such as the following are asked. "How well did you follow the instructions of your supervisor?" "What exactly did you say when your supervisor told you to speed up your work?" How did you feel when your supervisor criticized you?"

These procedures help each worker to understand his/her reactions to the work climate and in turn to identify specific behaviors that might be changed if conflict is to be avoided. As the worker is presented with additional opportunities to experience different work climates, he/she begins to acquire a repertoire of behaviors that can be used as alternatives to inappropriate ones that he/she might be initially inclined to use in a given situation. In short, this self-evaluation of a worker's vocational behaviors and subsequent adaptation to various work environments gradually evolved into an on-going, interactional process of work adjustment.

## Impressions

This model was used as part of a vocational assessment battery with developmentally handicapped adolescents prior to their entry into vocational special needs programs in public high schools and vocational schools in Northern and Southeastern Ohio. Feedback from these students and their evaluators revealed by-products of using this model besides obtaining profiles of the Students' work behaviors.

The students commented on the value of using video to see the effect of their behaviors on co-workers. Moreover, both the workers and their evaluators reported that the discussion sessions enabled them to set aside time to examine the students' underlying needs associated with their overt behaviors. The importance of this sharing of experience has been emphasized by mental health specialist such as Bass (1967) and Raymond (1975).

Workers stated that the model also enabled them to focus on behaviors that needed to be changed and to pace themselves when dealing with increasingly complex problems. This approach is consistent with that stressed by Gellman and Friedman (1965) who warned against placing workers in stressful situations before they could handle them.

## Discussion

To date the efficacy of this model has been measured through (a) interviews with handicapped students and vocational special needs personnel, and (b) direct observations of the students' increasing ability to demonstrate alternative and appropriate behaviors in contrived and actual work settings. The apparent success of this model thus far may be due in part to its uniqueness, and yet it would seem that this feature in and of itself does not explain the improvement that has been noticed in some students' overall ability to cope with work-related stress.

Haas (1949) maintained that instead of teaching individuals to avoid conflict, we should teach them to make conflict work. Most strategies for teaching individuals to cope with stress either have relied upon collaboration between the organization and the workers (Crowfoot & Chesler, 1982) or required the worker to engage in activities that removed him/her either mentally or physically from the stressful environment (Newman & Beehr, 1979). If the results of research which has evaluated the effectiveness of using self-monitoring techniques can be applied to stress reduction in work-related settings, then it would seem that this model has attained a relative measure of success due to its emphasis on an active and personal involvement of the worker in every step of the vocational evaluation and adjustment process. Ultimately this in turn may lead to improvement in a worker's decision-making (Payne, 1983); performance (Clark, 1982); and psychological, physical, and interpersonal qualities of life in general (Osipow, 1979).

Future research using the procedures and materials outline in this paper will undoubtedly shed additional light on the utility of this model for various types of professional involved with vocational evaluation. It is safe to say at this time, however, that information gathered through this approach can be of use in writing vocational goals for individualized education and rehabilitation programs, in examining a worker's disruptive behaviors within the context of a planned activity, and in monitoring changes in both the frequency and quality of a worker's work habits. At the very least, this model can facilitate a worker's transition from the protected atmosphere of a vocational training program to the complex demands of actual employment (Neff, 1971).

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# CAREER/VOCATIONAL ASSESSMENT IN THE PUBLIC SCHOOL SETTING: THE POSITION OF THE DIVISION ON CAREER DEVELOPMENT

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**ABSTRACT:** The area of career/vocational assessment is one of critical importance to the preparation of handicapped individuals for productive roles as citizens and workers. The purpose of this paper is to present the position of the Division on Career Development (DCD) of the Council for Exceptional Children. This paper was prepared by members of the DCD Committee on Career/Vocational Assessment and endorsed by the Executive Committee of the division. The following areas will be discussed:
(a) the definition, purpose, and goals of career/vocational assessment; (b) the assessment process and methods utilized in this process; and (c) the personnel involved in the assessment process.

## Definition, Purpose, and Goals of Career/Vocational Assessment

The establishment of an operational definition and purpose of assessment is basic to the other issues to be discussed in this paper since it determines to a great extent the methods and process to be used and the personnel to be involved in the assessment process. DCD recommends the use of the term "Career assessment" to define a developmental process beginning at the elementary level and continuing through adulthood. Career assessment is a broad term that includes "vocational assessment" or "vocational evaluation," much as career education encompasses vocational education. The career assessment process is one which should be integrally related to all aspects of career education, including not only preparation for employment, but also preparation for the roles of productive family member, citizen, and participant in leisure, recreational, and advocational activities that are of benefit to oneself and/or others. The specific content to be assessed in the career assessment process should be dictated by the components of the career education model being implemented.

The career assessment process should be viewed as a foundation for individualized program planning from kindergarten through adulthood. The goals of this assessment process should be specifically geared to providing the information needed to make decisions in all areas of career education programming; these decisions in all areas of career education programming; these decisions may be related to developing an individualized program (curriculum content) for the handicapped learner or determining what assistance the learner needs to succeed in an ongoing program. The results of the assessment process should be fully integrated into the Individualized Education Plan (IEP) or other program plan for the individual.

The career assessment process should have the following specific goals: (A) to assess the individual's interests, strengths, and needs that relate to his/her future roles as a family member, citizen, worker, and participant in leisure, recreational, and avocational activities; (b) to assess an individual's ability to learn and profit from instruction and the best methods for this instruction; (c) to provide data for determining the best placement within a specific career/vocational program; and (d) to determine the best placement alternatives for the individual at the conclusion of specific training program.

## Process and Methods

The Division on Career Development advocates for the view that career assessment is a continuous process that is integrally related to the ongoing instructional program for the handicapped learner. This process should begin in the elementary grades and continue through adulthood as long as divisions are being made relative to the career preparation on the handicapped individual.

DCD does not endorse any specific model or location for implementing the career assessment process. Whether it be done in the classroom setting or in vocational assessment center or mobile assessment laboratory, the results can be equally valid. DCD does, however, emphasize the need to determine the types of information to be collected based on the decisions that will be made in terms of the life-long career development of the handicapped individual. DCD also emphasizes the need to relate the assessment process to the current preparation needs of the individual. The assessment sequence should be parallel to the career programming sequence developed for each individual and should provide the information needed to make decisions in this program.

DCD does not advocate specific methods for obtaining assessment information but endorses the following concepts in the selection of methods and instruments. First, the selection of assessment methods should be specifically tailored to the types of information that need to be gathered and the decisions to be made. Second, specific instruments should be selected in light of the learning characteristics of the individual to be assessed. Third, the assessment program should utilize methods and instruments that involve tasks that closely resemble the tasks to be trained. Fourth, the assessment should be conducted in an environment that resembles as closely as possible the target employment environment and/or living environment of the handicapped individual. Finally, the assessment process should incorporate a sequence of assessment extended period of time.

## Personnel in the Career/Vocational Assessment Process

Personnel issues in career/vocational assessment are exceedingly complex. Not only do the issues in vocational assessment for school--aged youth still exist, but the downward extension of age and grade level and expansion of the concept to "career assessment" also pose additional problems that demand attention from professionals in the area.

DCD advocates that the personnel responsible for conducting and coordinating career assessment should be certified in special education when working at the elementary level and certified in secondary special education and/or vocational special needs education when working at the secondary level. Vocational special needs and rehabilitation personnel should assume primary responsibility at the post secondary level. This does not meat that counselors, school psycholog8sts, rehabilitation personnel, other teachers and support personnel, administrators, parents, and employers should not be involved in the process. It does mean, however, that the role of coordinating the career assessment process should be restricted to the professional primarily responsible advocate(s) for the learner's career development at nay particular stage in the educational process.

DCD also advocates that the professionals responsible for coordinating the career assessment process at the elementary level should have background in the areas of career development and informal assessment. The professionals responsible for conducting the career assessment at the secondary and post-secondary level should demonstrate background/training that meets the minimal standards of preparation in the area of vocational evaluation. DCD recommends that such preparation be based on demonstrated competency or successful completion of training in competencies such as the following:

(a) analysis of entry level competencies needed in the career development program;

(b) implementation of job analysis procedures;

(c) identification and selection of assessment procedures appropriate for students at various age and functioning levels;

(d) selection and administration of appropriate assessment instruments;

(e) construction of rating instruments for situational assessment and other behavior observations related to all career roles;

(f) integration and interpretation of assessment data;

(g) application of assessment data to instructional programs within the school setting.

DCD reiterates its commitment to work closely with vocational education, rehabilitation and school psychology personnel to integrate standards for public school personnel who are coordinating the career assessment process into those developed by the Commission on Certification of Work Adjustment and vocational Evaluation Specialists (CCWAVES).

## Summary

In summary the Division on Career Development defines career assessment as a developmental process which begins at the elementary level and continues throughout adulthood. This process, which includes the concept of "vocational assessment" (or "vocational evaluation"), should be integrally related to all aspects of career education, including not only preparation for employment, but also preparation for the roles of a productive family member, citizen, and participant in leisure, recreational, and avocational activities that are of benefit to oneself and/or others. DCD does not advocate a specific model, setting, or methods for implementing career assessment, but emphasizes that the career assessment process should be an ongoing sequence designed to parallel the career programming sequence developed for each individual and should provide the information needed to make decisions in this program.

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# LEVELS OF WORKER FUNCTIONS CLAIMED BY VALPAR FOR ITS WORK SAMPLES COMPARED TO THOSE DETERMINED THROUGH JOB ANALYSIS OF THE WORK SAMPLES

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**ABSTRACT:** Work samples constitute an important part of many vocational evaluations. The use of many commercial systems including Valpar, has expanded to a variety of settings outside the traditional rehabilitation center or sheltered workshop. For example, they are now being used in educational institutions, hospitals, and private evaluation units. Work vocational factors, either specific jobs, specific traits or clusters of traits. This study examines some aspects of the vocational basis of the Valpar Component Work Sample Series.

Each of the Valpar work samples states that it was developed in in relationship to job requirements and worker trade arrangement data in the Dictionary of Occupational Titles. Most of the work sample manuals state that the work sample is related to and apparently measures the client's ability to work with data, people, or things at a given level. This study examines this contention by comparing how closely the recommendations of data, people, or things level that Valpar claims for each work sample correspond with the actual level of data, people or things that the work samples measure and determined through job analysis.

Job analysis, using the standardized procedures and definitions contained in the Handbook for Analyzing Jobs was conducted on each of the sixteen Valpar Work Samples. The complete schedule was completed for each to data, people or things. The values for worker functions as determined through job analysis were than compared with the worker functions claimed for each work sample by Valpar.

Agreement between the two sources of worker functions levels varies widely among the various work samples. Work Sample Fifteen is the only one where the highest DPT levels completely match. In all the others, at least one of the others given by the Valpar is higher than found by job analysis. Work samples Ten, Thirteen, and Sixteen are close to each other on most values. For the other work samples, the two measures vary more the Valpar Work Samples are not involved with people above the eight or taking instructions level.

The given vocational basis of the Valpar Work Samples is not validated by this study. Most of the work samples do not appear to measure the complexity of worker functions that Valpar maintains. The specific job recommendations that accompany most work samples are also in question. In the case of Valpar and probably for evaluation in general at present, hardware will not substitute for the professional competence of the evaluator. The skillful evaluator can definitely determine whether a client is likely to be able to perform at higher worker functions than those claimed in the Valpar work Samples by observing and analyzing the client while he takes the work samples.

Further research definitely needs to be done on the vocational basis of the Valpar Work Samples. The evaluator who uses the work sample system definitely needs to have a valid basis for making vocational recommendations. The one presented by Valpar does not appear to be valid in most cases for the aspects that have been examined in this study.

Work samples constitute an important part of many vocational evaluations. Their purpose is usually stated to be either the assessing of abilities in one or a cluster of traits that are vocationally significant or the assessment of individual for success in a given job. Relating work samples to jobs and vocational information found in the Dictionary of Occupational Titles (DOT) (1977). This study examines selected vocational aspects of one major work sample system, the Valpar Component Work Sample Series.

Each of the 16 Valpar Work samples states that it was developed in relationship to the job requirements and worker trait arrangement data in the DOT (1965). Most work sample manuals state that work samples are related to and apparently measure client ability to work with data, people, or things at a given level. This study will examine this contention.

### Statement of Problem

This study seeks to examine how closely Valpar work sample claims regarding or things correspond with the levels of data, people, or things, determined through job analysis associated with the work samples determined through job analysis.

### Definition of Terms

The DOT (1977) lists and describes 12,099 occupational titles, each assigned a nine digit code. The first three digits identify the occupational categories, divisions, and groups into which specific titles are assigned. The last three digits identify the frequency of the titles, in alphabetical order, which have the same first six digits. The middle three digits identify the relationship that the title has to data, people, and things (DPT). The lower a DPT digit is, the more complex is the functioning of the occupational title for the particular attribute. Each level of a DPT digit is assumed to potentially include all the functions in the particular category for each of the lower levels. See the Handbook for Analyzing Jobs (1972) for more information about the DPT concept.

Job analysis is a systematic procedure as defined by the U.S. Department of Labor to identify, classify, and record the significant characteristics of an individual job. These factors include: Worker functions (DPT), description of tasks, general educational development, specific vocational preparation, aptitudes, temperaments, interests, physical demands, environmental conditions, and the like. (U.S. Labor Dept., 1972).

### Review of the Relevant Literature

The only materials directly related to the DPT structure of the Valpar work samples are the manuals that have been published for each work sample. Each manual contains a description of the occupationally significant characteristics that the work sample is supposed to measure, i.e. the type of jobs or physical capacities that are directly related to the work sample. Valpar maintains that the job characteristics it details for each work sample are derived from the DOT (1965) but does not explain how this information was derived or give specific rationale for its inclusion. Most manuals say that the work sample best relates to jobs dealing with data, people, or things at a given DPT level. Certain work samples (numbers 4, 9, and 14) are said to measure physical factors or other specific attributes from the DOT (1965), such as preference for dealing with people. These work samples are said to not be as closely tied to DPT functions as the others. Most manuals also give a description of work performed and worker requirements of jobs that are said to be closely related to the work sample. Examples of specific occupations that are said to be primarily related to the work sample and related worker trait groups are usually given for each work sample.

The reader is referred to Botterbusch (1980) pp. 74-78 for a general assessment of Valpar work samples, and to the various Valpar manuals for detailed information about the administration of the work samples.

## Data Analysis Technique

Using the standardized procedures and definitions contained in the Handbook for Analyzing Jobs (1972) job analysis was conducted on each of the 16 Valpar Work Samples. The complete schedule was completed, but this presentation will only consider worker functions - relationship to data, people and things. The job analysis was accomplished using a combination of the author's personal knowledge about the work sample procedures and the instructions contained in the work sample manual. a client was not observed performing the actual work sample, but the author has several years experience in administering the Valpar work samples and is thoroughly familiar with their operation.

Due to space limitations, only two of the valpar work samples will be considered in detail, number 1 and 10. first, the operation involved in each work sample will be summarized. Then, the level of worker functions (DPT) claimed by Valpar will be compared to the levels determined by job analysis. It should be noted that Valpar expresses DPT in terms of the classification used for third edition of the DOT. For this analysis, the DPT codes have been converted to that used in the fourth edition of the DOT.

## Data Analysis

### Valpar Work Sample #1 - Small Tools (Mechanical)

The manual of this work sample states that it measures a person's understanding of, and ability to work with, small tools. It is also said simulate many of the awkward working situations facing a person using small tools on the job (Valpar, 1974, P. 1., a).

In this work sample, the client uses screw drivers, pliers, nut drivers and wrenches to assemble and remove screws, hitchpins, nuts, bolts, washers, and the like attached to the sides of a hinged, five-sided work box with a hole in front for the client to work through. the work box is closed for assembly and opened for disassembly. assembly is accomplished in sections. The evaluator gives the client detailed instructions about the hand tools to be used for each section, the parts to be assembled, and the arrangement that the parts will assume. The client is also provided with a diagram which shows, section by section, the same information. After the client has assembled all of the parts, he is required to disassemble the parts using the correct hand tools. The s
client again has the diagram for a guide.

Valpar maintains that this work sample best relates to jobs dealing with "data" and "things" at the 281, 381, 681, and 684 levels (Valpar, 1974, p. 2., a).

"Data" is determined by job analysis to be at the 6 or Comparing level. The client is only required to deal with readily observable characteristics. The client can compare the hand tools and arrangement of parts pictured on the diagram with that in his assembly. there is also an example of each correctly completed assembly, except for one of the sections, in the work box. For the disassembly section, the client can again compare the hand tools on the diagram for each section with those that are chosen for disassembly.

"People" is determined by job analysis to be at the 8 or Taking Instructions-Helping level. Almost all of the work sample has to "people" is that the client is required to take instructions from the evaluator to accomplish the proper procedure.

"Things" is at the 4 or Manipulating level. The client is required to use a variety of hand tools in this work sample and has to exercise some latitude for judgement in regard to the precision attained. The client, however, can readily do this by consulting the diagrams and examples that are provided, and a higher level for "things" does not appear to be justified.

The author agrees that this work sample does require dexterous use of hand tools, but does not see how it could be considered as measuring higher than 6 for "data" and 4 for "things". The author does think that this is a useful work sample for assessing physical aptitudes such as motor coordination, manual dexterity, and finger dexterity , and that this is what should be looked for in work sample performance rather than the ability to work with "data" or "things" at higher levels than stated previously.

## Valpar Work Sample #10 - Tri-leve Measurement

This work sample is said by the manual to measure a client's ability to perform very simple to very precise inspection and measurement tasks and to evaluate a client's decision making ability (Valpar, 1974, p. 1., b). This work sample is said to best relate to those jobs dealing with "data" and "things" at the 280, 281, 381, 687, 681, 682, 684, 685, and 686 levels (Valpar, 1974, P. 2., b).

For this work sample, the client is working with a series of metal pieces that were tooled on an automatic lathe. The client is to follow a precise series of inspection steps that are explained by the evaluator and outlined on a series of diagrams. The inspection progresses from visual to using various jigs, a ruler, micrometer, and venier caliper to determine if the pieces meet certain precise standards. If at any point during the inspection a piece does not meet the standard, it is deposited in a box labeled for that error. There are nine separate inspection tasks in the work sample. The client is first given detailed instructions including description of the use of various measuring devices. The client is then given a chance to practice the procedure using a series of metal pieces that include examples of all the errors. After the practice section, the evaluator points out any errors that were made. The client then does the main part of the work sample.

Job analysis shows that this work sample requires the use of "data" at the 2 or Analyzing level. The client is required to be constantly examining and evaluating data and dealing with this data on a rather complicated level which requires the taking of alternative actions depending upon perception of the data.

For this work sample, the client is again required to deal with "people" at the 8 or Taking Instructions-Helping level. The client is required to follow instructions given by the evaluator.

In this work sample, the client deals with "things" at the 1 or Precision Working level. The client is required to use complicated and precise measuring devices, such as the micrometer and venier caliper. Adjustment of these tools is essentially up to the client and requires the exercise of considerable judgement.

The worker function levels in this work sample as maintained by Valpar are close to those determined by job analysis. Both agree that the work sample will measure "data" at the 2 or analyzing level. Valpar says that it will measure "things" at the 0 or Setting-up level but job analysis found components up to the 1 or Precision Working level.

## Summary and Conclusions

Table 1 summarizes the results of the analysis. Worker function levels obtained from job analysis are contrasted with those presented by Valpar. The agreement between the two sources varies widely among the various work samples. Work sample #15 is the only one where the highest levels completely match. In all the others, at least one of the levels given by #16 are close to each other on most values. For the other work samples, the two measures vary more widely. It should especially be noted that except for work sample #14, the Valpar work samples are not involved with "people" above the 8 or Taking instruction-Helping level.

The given vocational basis of the Valpar work samples is not validated by this study. It is somewhat difficult to assess vocational aspects of this work sample system because Valpar gives essentially no information as to how it was derived other than to day that it came from the DOT. Most of the work samples do not appear to measure the complexity of work functions that Valpar maintains. The specific job recommendations that accompany most work samples are, therefore, also in question. In the case of Valpar and probably for evaluation in general at present, hardware will not substitute for the professional competence of the evaluator. The skillful evaluator can definitely determine whether a client is likely to be able to perform higher worker function than those inherent in many Valpar work samples by observing and analyzing the client while he takes the work samples.

Further research definitely needs to be done on the vocational basis of the Valpar work samples. The evaluator that uses the work sample system needs to have a valid basis for making vocational recommendations. The one presented by Valpar does not appear to be completely valid in most cases for the aspects that have been examined in this study.

### Appendix

### LIST OF VALPAR WORK SAMPLES

Work Sample #1- Small Tools (Mechanical)

Work Sample #2- Size Discrimination

Work Sample #3- Numerical Sorting

Work Sample #4- Upper Extremity Range of Motion

Work Sample #5- Clerical Comprehension and Aptitude

Work Sample #6- Independent Problem Solving

Work Sample #7- Multi-Level Sorting

Work Sample #8- Simulated Assembly

Work Sample #9- Whole Body Range of Motion

Work Sample #10- Tri-Level Measurement

Work Sample #11- Eye-Hand-Foot Coordination

Work Sample #12- Soldering and Inspection

Work Sample #13- Money Handling

Work Sample #14- Integrated Peer Performance

Work Sample #15- Electrical Circuitry and Print Reading

Work Sample #16- Drafting

Table 1

Levels of Work Functions Claimed by Valpar for its Work Samples

Compared to those Determined by Job Analysis

| | By Valpar | | | From Job Analysis | | |
|---|---|---|---|---|---|---|
| Work Sample | Data | People | Things | Data | People | Things |
| Number 1 | 2* | 8 | 1* | 6 | 8 | 4 |
| | 3 | 8 | 1 | | | |
| | 6 | 8 | 0 | | | |
| | 6 | 8 | 1 | | | |
| | 6 | 8 | 4 | | | |
| Number 2 | 6* | 8 | 4* | 6 | 8 | 4 |
| | 6 | 8 | 1 | | | |
| Number 3 | 4* | 8 | 4* | 6 | 8 | 4 |
| | 4 | 8 | 5 | | | |
| | 5 | 8 | 4 | | | |
| | 5 | 8 | 7 | | | |
| | 6 | 8 | 4 | | | |
| | 6 | 8 | 5 | | | |
| | 6 | 8 | 7 | | | |
| Number 4 | | N/A | | 6 | 8 | 6 |

*Categories that Valpar says are most closely related to the work sample.

Table 1 (cont.)

| | By Valpar | | | From Job Analysis | | |
|---|---|---|---|---|---|---|
| Work Sample | Data | People | Things | Data | People | Things |
| Number 5 | 1* | 3* | 7* | 3 | 8 | 2 |
| | 2 | 6 | 7 | | | |
| | 2 | 8 | 7 | | | |
| | 3 | 6 | 7 | | | |
| | 3 | 8 | 7 | | | |
| | 5 | 8 | 7 | | | |
| | 4 | 6 | 7 | | | |
| | 6 | 6 | 2 | | | |
| | 6 | 8 | 7 | | | |
| Number 6 | 1* | 3 | 7 | 6 | 8 | 4 |
| | 3 | 6 | 7 | | | |
| | 3 | 8 | 7 | | | |
| | 4 | 8 | 7 | | | |
| | 5 | 8 | 7 | | | |
| | 6 | 4 | 7 | | | |
| | 6 | 8 | 7 | | | |
| | 6 | 8 | 4 | | | |
| Number 7 | 2* | 8 | 1* | 6 | 8 | 4 |
| | 2 | 8 | 2 | | | |
| | 3 | 8 | 1 | | | |
| | 3 | 8 | 2 | | | |
| | 3 | 8 | 3 | | | |
| | 4 | 8 | 3 | | | |
| | 6 | 8 | 4 | | | |
| | 2 | 5* | 7 | | | |
| | 2 | 7 | 1 | | | |
| | 3 | 5 | 7 | | | |
| | 3 | 7 | 1 | | | |
| | 4 | 5 | 6 | | | |
| | 4 | 7 | 7 | | | |
| Number 8 | 6 | 8 | 5* | 6 | 8 | 6 |
| | 6 | 8 | 6 | | | |
| | 6 | 8 | 7 | | | |
| Number 9 | | N/A | | 6 | 8 | 7 |
| Number 10 | 2* | 8 | 0* | 2 | 8 | 1 |
| | 2 | 8 | 1 | | | |
| | 3 | 8 | 1 | | | |
| | 6 | 8 | 7 | | | |
| | 6 | 8 | 1 | | | |
| | 6 | 8 | 2 | | | |
| | 6 | 8 | 4 | | | |
| | 6 | 8 | 5 | | | |
| | 6 | 8 | 7 | | | |
| Number 11 | 2 | 8 | 1* | 6 | 8 | 3 |
| | 3 | 8 | 0 | | | |
| | 3 | 8 | 1 | | | |
| | 6 | 8 | 2 | | | |
| | 6 | 8 | 3 | | | |
| | 6 | 8 | 5 | | | |
| | 6 | 8 | 7 | | | |
| Number 12 | 2* | 8 | 1* | 6 | 8 | 4 |
| | 6 | 8 | 1 | | | |
| | 6 | 8 | 4 | | | |
| Number 13 | 1* | 6* | 7 | 1 | 8 | 7 |
| | 2 | 6 | 7 | | | |
| | 3 | 6 | 7 | | | |
| | 2 | 8 | 7 | | | |
| | 3 | 8 | 7 | | | |
| | 4 | 6 | 7 | | | |
| | 4 | 7 | 7 | | | |
| | 4 | 8 | 7 | | | |
| Number 14 | | N/A | | 1 | 3 | 3 |
| Number 15 | 2* | 8 | 1* | 2 | 8 | 1 |
| | 3 | 8 | 1 | | | |
| | 6 | 8 | 4 | | | |
| | 6 | 8 | 7 | | | |
| Number 16 | 2* | 8 | 1* | 2 | 8 | 1 |
| | 1 | 8 | 7 | | | |
| | 1 | 6 | 7 | | | |

*Categories that Valpar says are most closely related to the work sample.

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# VOCATIONAL OUTCOMES ASSOCIATED WITH LOWER EXTREMITY AMPUTATIONS

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**ABSTRACT:** Lower extremity amputation is a severe disability that affects a person's vocational abilities. Limited information is available that describes this impact. The vocational, amputation, and background histories of 31 persons with a lower extremity amputation were gathered through a structured interview format. The results of the interviews were defined in terms of vocational status and Department of Labor standards on physical demands and working conditions. Background variables were compared to employment status to differentiate between the employed and unemployed subjects. Pre and postamputation employment was compared using the Department of Labor standards. Intervention strategies for vocational assessment and rehabilitation were suggested.

Amputation of an extremity has long been regarded as a complicated disability because of the numerous medical, social, and psychological implications associated with the loss of a limb. There are an estimated 311,000 persons in the United States with a major extremity amputation (Friedman, 1981) and an additional 43,000 individuals have amputations each year (Banerjee, 1982). Approximately 90% of amputations involve the lower extremities and more than half of these are the result of vascular disease (Friedman, 1981).

Many factors play a role in the effectiveness of ongoing rehabilitation efforts that are available for persons with amputations. Success and failure is frequently defined in different ways by the many professionals that come in contact with persons disabled by an amputation. Successful employment in a competitive environment, however, is an outcome that implies mastery of many of the components of a comprehensive rehabilitation effort.

Personal and social adjustment to the loss of a limb, as well as a stable medical status are several of the important considerations which determine success of a rehabilitation effort. Much has been written about these psychological and social aspects. Less has been written about functional abilities following amputations and even less about how all of these factors influence a person's ability to participate in gainful employment. Employability following an amputation is directly influenced by physical skills of the person involved and the corresponding demands of the jobs in the available market. Indeed, vocational counseling, vocational investigation and retraining have been cited as essential components of a rehabilitation program for persons with amputations who are of working age (Kindon and Pearce, 1982).

The most significant factor related to functional ability is the level of the amputation. This is true for several reasons, including the obvious loss of bone and muscle tissue, heavy prostheses and alterations in body metabolism. Because of these considerations mobility, balance and endurance are factors that may produce limitations on a job. Persons with amputations are encouraged to avoid jobs which require excessive walking, constant standing, climbing, crawling, kneeling and lifting heavy objects (Wright, 1980). The use of a prosthesis is also a source of limitation: prostheses are inherently uncomfortable, do not allow the enclosed stump to breathe and are subject to mechanical malfunctions. Consequently, extremely cold, warm and/or dusty environments are suggested employment places to be avoided (Friedman, 1981).

Little is presently known about actual vocational experience of persons with amputations. Experience reveals that many do not work in sedentary or light jobs even with high school or college educations. Some work in physically demanding jobs as soon as they are medically able, even with over-riding systemic disease symptoms. Experience suggests that present vocational assessment and counseling methods do not adequately address the comprehensive nature of employment of persons with amputations. Only when more information is available that defines what persons with amputations are and are not doing, and what differentiates between those employed and unemployed, will more effective strategies for intervention be developed.

In a recent pilot study an attempt was made to define actual vocational outcomes of 31 persons with lower extremity amputations. The subjects for this study were persons in attendance at the University of Mississippi Medical Center Amputee Clinic during a six week period in 1984. All persons attending the clinic between the ages of 18 and 64 and demonstrating a lower extremity amputation freely consented to participate in the study. Background data and information related to the subjects' vocational and amputation histories were gathered through a structured interview format.

## Results

The median age of the predominantly male subjects was 39 years (range 19-63 years) and the median time since amputation was 3 years (range 1 month - 36 years). The most common cause of the amputation was diabetic related disease and the mean education level of the subjects was completion of the ninth grade. Most of the subjects were independent ambulators and most felt that their personal desire and motivation was their best source of vocational help.

Twenty-six subjects were employed or in school at the time of their amputation. The remaining five were on disability. At the time of the survey six of the subjects were employed full time and two part time. An additional four were not working but had worked since their amputation. The remaining 19 subjects had not been employed in any way after their amputation.

The relationship between several subject variables and employment status was examined through the use of chi-square statistics. Educational level, age, time since and cause of amputation, ambulation status and perception of vocational assistance were the background variables evaluated. Because of the limited number of subjects in this study (n=31) these background variables were collapsed to offset the chi-square tendency toward observed frequency skewness seen when the expected frequencies of a distribution are very small.

Three variables proved to be significant factors in separating the employed and unemployed subjects: ambulation status, time since amputation, and vocational assistance. The first two factors showed that persons were more likely to be employed if they were independent ambulators (with or without a cane) and if more than 30 months had passed since their amputation. Persons were also more likely to be employed if they attributed their vocational rehabilitation to intrinsic factors (personal desire and motivation) rather than to external factors, such as help from physicians, therapists, vocational rehabilitation counselors or an understanding employer. The cause of the amputation (traumatic or non-traumatic), educational background (completion or non-completion of at least 10th grade in high school) and age (above or below the median of 39 years) were not significant factors in separating the employed and unemployed subjects.

The final aspect of this study was a comparison of before and after amputation employment. Standardized information, available through the Department of Labor (DOT, 1977, Handbook for Analyzing Jobs, 1977, & Field & Field, 1977) was the basis of this comparison. Seven subjects, those who were employed before and had worked after their amputation, were included in this analysis.

The job characteristics used to describe the subjects pre and postamputation employment included 13 variables. These variables and the frequency distribution of job ratings are listed in Table 1. Only two variables, No.1 (Strength) and No. 7 (In/Outdoors), are defined for every job. The remaining 11 variables are listed for a job only if that factor is a significant part of that job.

Table 1

Frequency Distributions of Standardized Job Variables
Associated With Pre and Postamputation Employment

| | Employment | |
|---|---|---|
| | Pre | Post |
| Job Variable | N | N |
| A. Physical Demands | | |
| 1. Strength-Sedentary | 0 | 0 |
| Light | 2 | 3 |
| Medium | 2 | 3 |
| Heavy | 1 | 1 |
| Very Heavy | 2 | 0 |
| 2. Climbing and/or balancing | 3 | 1 |
| 3. Stooping, kneeling, crawling, crouching | 5 | 5 |
| 4. Reaching, handling, fingering, feeling | 6 | 5 |
| 5. Talking and/or hearing | 3 | 4 |
| 6. Seeing | 4 | 3 |
| B. Working Conditions | | |
| 7. Indoors | 3 | 2 |
| Outdoors | 2 | 1 |
| Both | 2 | 4 |
| 8. Extremes of cold | 0 | 0 |
| 9. Extremes of heat | 0 | 0 |
| 10. Wet and humid | 0 | 0 |
| 11. Noise and vibration | 3 | 2 |
| 12. Hazards | 1 | 1 |
| 13. Fumes, odors, toxic condiations, dust, poor ventilation | 0 | 1 |

Two methods were used to compare the Strength variable before and after amputation. First, the strength categories were ranked in a 1 to 5 interval scale (1 = sedentary, 3 = medium, 5 = very heavy). A t-test for nonindependent groups showed that the pre and postamputation employment strength means of 3.43 and 2.71, respectively, were not significant. The strength categories were also ranked in an ordinal scale with values corresponding to the minimum strength (in pounds) cited in the definition of each category (0 = sedentary, 10 = light, 20 = medium, 50 = heavy, 100 = very heavy). A t-test showed that the pre and postamputation employment strength means of 44 and 20 pounds, respectively, were not significant. Descriptively, four subjects returned to a job requiring less strength, two did not change strength demands and one returned to a job which required more strength?

The remaining Physical Demands and the Working Conditions were evaluated by looking at how each individual's job changed in terms of an addition or a subtraction of an interfering or noninterfering variable. Physical demands No. 2 and No. 3 (climbing and/or balancing; and stooping, kneeling, crawling and crouching) were judged to be interfering vocational variables for the subjects. The remaining Physical Demands (reaching, etc., talking and/or hearing, and seeing) were judged to be non-interfering vocational variables. All of the Working Conditions (except work indoors) were judged to be interfering variables. Postamputation employment differed from preamputation employment in the following ways: three interfering and four non-interfering Physical Demand Variables were no longer significant in the post-amputation jobs, four noninterfering variables became significant. One interfering Working Condition was lost, one was gained. Five individuals did not change the Indoor/Outdoor/Both rating of their job. One subject's job became more outdoors oriented, one more indoors oriented. Collectively, 60 percent of the changes were accommodating to the amputation, 40 percent were not.

## Discussion

Three variables proved to differentiate between the employed and unemployed subjects in this study. The ability to ambulate independently (with or without a cane) was a significant variable and suggests that mobility is a key factor for employment. Of course, ambulation status may actually be indicative of a more general state of health and hence influence employability from a broader base. If mobility itself is the key however, efforts toward increasing accessibility of the work place to wheelchairs (and increasing wheelchair acceptability in employers' minds) would be an effective intervention to improve return to work rates for persons with lower extremity amputations.

Time since amputation was also a significant factor and suggested that as more time passes from an amputation (exceeding 30 months) the more likely the individual will be employed. This result is in conflict with the widely held view that the longer an individual is out of work, the less likely he/she is to return. There were several subjects in this study who were interviewed very soon (less than 6 months) after their amputation and medically may not have been able to work at that point in their recovery. This influence may have unfairly skewed the result of this evaluation. The key factor that influenced this return to work variable appears to be expectation. Expectation appears clearly related to time and the more time that passes from employment the less the expectation is of returning to work.

The personal perception of source of vocational assistance was another significant factor in differentiating between the employed and unemployed subjects in this study. Those individuals who cited intrinsic factors as opposed to external agents were more likely to be employed. This result is in accordance with the growing awareness of the limitations of the medical model of illness management. The entire issue of employment with a severe disability such as an amputation is too broad and encompassing to be "taken care of" by an extraneous force. Unfortunately, most members of this society are not taught to be responsible for their own health. Instead, they are encouraged to allow professionals to make the decisions and solve the problems associated with their bodies. If this attitude holds in light of a severe disability, frustration, anger and resentment can be the only result. This perspective of personal responsibility toward care following an amputation holds great promise as a counseling tool.

Assisting an individual to take responsibility for their own future can provide direction and focus for that future. Further research exploring the concept of locus of control and employment following amputation is clearly indicated.

Age, cause of amputation, and education were not significant variables in differentiating between employed and unemployed subjects in this study. This evidence serves as a reminder that older, less educated individuals do have employment potential and should not be slighted in any type of rehabilitation program. This perception may appear obvious to rehabilitation professionals, but everday practice too often conforms to other forces that do not enjoy this insight. Efforts need to be made to conscientiously apply this principle in practice.

The final aspect of this study compared employment characteristics, pre and postamputation. The Department of Labor provides a vast array of standardized information to assist with this type of evaluation. The nationwide applicability of any results using this data makes it a tool of great importance. For example, the results of this study suggest that lifting and carrying abilities are not significantly reduced for persons with lower extremity amputations. Individual differences did show a tendency toward engaging in lighter work, but a firm cut off for the capacity was not suggested. Also, the evaluation of the remaining physical capacities and work conditions suggested a similar relationship.

Individual accommodation was made toward the amputation but no general point of conformity was suggested. Undoubtedly, the limited nature of this study does not warrant absolute guidelines. However, if the physical and environmental characteristics of jobs that represent successful employment for persons with amputations can be identified and defined in terms compatible with Department of Labor data, a more effective vocational assessment device will result. Indeed, all standardized job information available through the Department of Labor, e.g. job temperaments and interests, can be viewed in this same manner. Much research is needed in this area so the present tools of vocational assessment can be more fully utilized.

## Summary

Lower extremity amputation is a disability that has a definite impact on a person's vocational life. This study attempted to define that impact in terms of change in employment status and employment characteristics seen with an amputation. Many factors appear to be significant including ambulation status, expectations and perception of source of vocational assistance. Educational and age did not appear to be as important in predicting employability as might be expected. Department of Labor standardized information was used as a tool to evaluate pre and postamputation employment. This extensive tool has not been utilized to its fullest capacity as a vocational assessment instrument. It has the potential to provide valuable information about physical capacities and environmental conditions in the work place. Any results or guidelines developed using this tool have nationwide applicability.

There is a gap between the realities of present vocational rehabilitation techniques and the experience of having a lower extremity amputation. The two are compatible and further research is needed to bring them together.

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# WORK HARDENING MODEL FOR THE 80'S

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**ABSTRACT:** A search of the literature reveals that work hardening has a long history as a treatment process for the injured and disabled. This paper compares and contrasts work hardening models and describes a model for current practice that draws upon the best from the past and meets the needs of today.

Graded (progressively demanding) exercise and tolerance concepts were used very early in the treatment of tuberculosis patients. Briggs (1949) referred to the addition, in 1859, of graded exercise and work tolerance to the medical regimen of good food and fresh air for tuberculosis treatment. Graded exercise was introduced first, progressing to graded work tolerance in accordance with each patient's physical capacity as determined by their physician. The graded programs were used as a final stage of treatment or to accompany long periods of enforced bed rest. Exercise took the form of walking and "conversational" therapy progressing to more demanding tasks in terms of amount of physical exertion and satisfaction of social, vocational and economic needs. Group activity in occupational therapy was used for its objectives of work tolerance as well as social rehabilitation. Specific work tolerance tasks such as woodworking and various clerical tasks were prescribed based upon their usefulness in estimating resistance to breakdown from physical effort and emotional upsets.

In 1924 Kidner wrote about a program of "habit training" which he defined as development of the habits of industry that had been impaired by disease or accident. Such habits are more commonly referred to now as worker characteristics.

Work hardening appears in the psychiatric literature in the 40's especially in regards to preparing the patient for return to competitive life after the sheltered life of the hospital ward (Phelan). The programs featured realistic work environments, perhaps using the hospital laundry, barber shop or carpentry shop. Patients were observed by their physicians during progressively demanding work tasks for cooperation and friendliness as these were felt to be important personality traits if the person was to work "harmoniously" after discharge. Instruction and training for specific skills were frequently undertaken by the manual arts therapists during the usually lengthy stays. Medical supervision was inherent and decisions were made at each step by the attending psychiatrist or physiatrist.

Work hardening programs of the 40's for physically handicapped shared many of the same goals and features as those for mentally disabled (Thompson). Work experiences were provided which were a representative of jobs available in the community. Programs were designed to make the worker quickly aware of the relationship of his work hardening program to a job which may support his family. While work speed was variable quality standards of work should not be, warned the author. The treating physician determined the time for resumption of employment. Following work hardening a detailed report was prepared by the supervising occupational therapist including information on personality traits and physical limitations gleaned from close acquaintance and observation.

In the 50's Watkins (1959) described a program using the non-medical departments of Massachusetts General Hospital for restoration of physical tolerances. Physiatrists directed the program of medical evaluation and therapy. Occupational therapists directed prevocational and work therapy with a vocational counselor responsible for establishing vocational goals and placement. In order to aid evaluation of progress, a progressive resistive exercise component was added. By measuring increased strength in pounds they were able to track progress in developing tolerances. This feature was reported rather as an afterthought but documents an early effort to objectify and quantify the program.

Wegg wrote in 1957 about moves to standardize and objectify the work therapy program at May T. Morrison Center for Rehabilitation in San Francisco, California. She described features of the occupational therapist supervised program which was designed along the lines of the Workmen's Compensation Convalescent Centre in Malton, Canada. Features of the San Francisco program included simulation of on-the-job conditions and tasks for the individual patient which were used to estimate ability and as an exercise medium to develop work habits, confidence, increase physical and emotional tolerance, improve strength, range of motion, coordination and dexterity. Activities were graded as to length of time, resistances used, distance weights were lifted and carried, positions of work, etc., to maintain and improve strength and endurance for a full work day. All referrals were made by a physician and the number of hours of participation was prescribed by the physician.

Prior to testing, the vocational counselor, physiatrist, occupational therapist and industrial engineer drew up a work sample prescription and schedule for testing. The industrial engineer evaluated the finished product as to its acceptance by an employer. The occupational therapist differentiated innate dexterity or mechanical "know how" from defects in training (of prosthetics for example) or defects due to the disability. The occupational therapist also judged emotional aspects of work performance.

Reports of performance, recommendations for assistive equipment, therapeutic programs, length of work day and actual job classifications were made by the occupational therapist and industrial engineer. Little practical information was available in the literature at the time on work testing, work sampling or job simulation therefore original tests were developed and used. In reporting findings several programs were encountered when setting up standard procedure by which to evaluate individual program results. First was the setting of a point of reference or "norms." Second was the problem of evaluating trends in production speed. Third was evaluating the significance of errors. Fourth was the problem of evaluating the worker on the basis of subjective observation of the previous qualities.

Just three years later, in 1960, Wegg described the same program but with significant changes. Work hardening had moved away from the medical model toward a vocational model and adherence to a scientific approach. A physician's prescription was no longer needed. Instead a recent physical examination or approval of worker participation was required. Physical conditioning and adjustment was seen as a distinct program to follow work evaluation since the purpose of hardening was to develop work habits or improve work assets as noted in the evaluation. To attempt to do both functions simultaneously would lead to loss of the scientific approach.

Ethridge proposed work as a treatment media for all disabilities. He described a program in a state psychiatric hospital which he stressed was applicable to any hospital and any occupational therapy department. Within the hospital environment 205 different work assignments were developed. A very popular and therapeutic work assignment was cigarette rolling! The finished product was sold to the patients at a cost much lower than commercially available. The advantages were obvious in that the work was gratifying meaningful, real, successful in building tolerances and it was motivating for personal financial reasons. Each work assignment combined these elements in that each was real, productive work and not merely exercise or diversion.

A similar emphasis on real work was incorporated into the work therapy program at UCLA Neuropsychiatric Institute, a short-term private hospital (Poussaint). He pointed to the benefits of work, persuaded that through work people derive their feelings of status, worth, satisfaction and sense of fulfillment that is of lasting value. Patients were referred to the program by psychiatrists and assigned and guided by the occupational therapy department to work tasks in the short stay community hospital. Assignments to work therapy were as brief as one week with a work day of three to eight hours. Even the shortest duration assignments contributed substantially to recovery of patients and return to the community.

Societal changes in the 70's signaled major changes in the work force and access to jobs. Opportunities to work were, as never before, influenced by urbanization, technology and education (Johnson). These changes in the nature and meaning of work necessitated changes in the use of work as therapy. Jobs once performed by disabled people such as collating were, for the most part taken over by machines. Some jobs began to have a limited life expectancy. Preparation of disabled worker thus needed to incorporate the more generic tolerances and use transferable skills and the worker characteristics necessary for any job.

Diasio and Jones (1970), in their work with psychiatric clients also concentrated on development of worker characteristics along with specific work tolerances. Their program sought to foster development of new behavior repertoires which would bring greater vocational acceptance. They made it clear to their young adult clients that they were engaged in a voluntary collaborative relationship to develop these behaviors. The program, as in former decades, used realistic work settings within the hospital and they also moved out of the institution to use community settings.

The 1980's brought a new sophistication to the process of increasing a person's work place tolerance. The view of man has moved from a reductionistic, mechanical model to one of an integrated whole. This was facilitated by General Systems Theory (Von Bertalanffy, Simon) and the integration of various disciplines into an integrated network. Man was viewed as a system of interconnected sub-systems which when integrated into a "system" became more than what the parts were separately. Man as a system was described in several ways (Lawton, Pfeiffer, Paulson, Kielhofner and Burke, McFarlane). Kielhofner and Burke developed a model of human occupation that included input, throughput, output, and feedback. The throughput was divided into the volitional subsystem, this included the person's goals, values, and sense of personal causation, the habituation subsystem, which included the personal internalized roles and habits, and the production subsystem, which included the person's skilled actions and cognitive abilities. This model also included the environment. The environment was composed of objects, people, and events. The environment was both the source of the input as well as receiver of the systems output.

In this model, the system is a hierarchy in that the subsystems are arranged in an order such that the higher subsystem control the lower order subsystem, however, the lower order subsystems need to operate effectively for the higher systems to be able to exist. In the human occupation model, the person's volitional subsystem controls their performance subsystem. Clinically, this is seen in the individual that may have the physical tolerances for employment, but is not motivated to use their capabilities. Another example is the severely involved spinal injured client who does not have extensive physical capabilities but whose motivation enables them to be employable. The habituation subsystem is most familiar to vocational counselors as the "worker traits or worker characteristics" of attendance, punctuality, grooming and self-care, and worker role behaviors. This subsystem maintains the system's behavior in routine patterns. Thus, the worker must get up at a set time, and follow a daily routine to not only get to work, but to carry out their daily duties once on the job. The performance subsystem consists of skills. The skills are the organized component actions that lead to the accomplishment of a goal. Skills entail both neurological and kinesiological as well as cognitive areas. The performance subsystem produces action on the environment; a machinist tightening bolts or a salesman writing up an order.

The environment in the model consists of objects, people, and events. The objects in the work hardening environment are usually vocational oriented. There are few medical objects, such as stainless steel tables, white walls, and stethoscopes. There are work benches, secretarial desks and chairs, drafting tables, and machinery. The people in the environment are not dressed in white coats. They may be therapists, but they have replaced their medical cloak for vocational attire. They play the joint role of therapist and supervisor. Coffee breaks, lunch breaks, being assigned a new job task, and filling out time cards are a few of the events that take place in the environment.

Work hardening, using a general systems approach, gives the clinician a variety of variables to manipulate and explain a client's performance in the hardening setting. The model of human occupation tells the clinician to observe the client's interactions with the environment. The client's motivation, habituation, or performance subsystems may be hindering them from employability. Perhaps the environment is not supportive of the person. This inclusion of the environment into the work hardening process is exemplified in the growing body of literature on "ergonomics."

Ergonomics, the person-environmental fit in the workplace gives the work hardening clinician the tools to assess, change, and modify the work place. The literature of the past five years has grown since it was recognized that injuries and costly disability claims could be prevented by the proper environment-person fit (Chaffin and Anderson). The adjustment of chairs, desk heights, and lifting devices are a few of the common applications of ergonomics.

In the work hardening center, the work station is a laboratory in which the various elements can be altered to obtain the optimum performance. An example would be elevating the working surface of an electronic assembler with a platform so that the person does not have to lean over the bench and strain their back. Arms, legs, feet, and hands can be supported. Tools can be padded to prevent vibration. Chairs can be lowered or raised. The person's anthropomorphic dimensions, the job's biomechanics, and the work station's dimensions are all necessary components of a complete work hardening assessment and treatment regimen.

This need to apply diverse disciplines to a common problem, in returning the person to work, has led to the expansion of the work hardening programs to realization as in past decades, that a multidisciplinary approach would be needed. This current multidisciplinary approach was described by L. Matheson. Occupational therapists, vocational evaluators, physical therapists, and psychologists are part of the work hardening team. The application of the physiological and kinesiological backgrounds of the occupational and physical therapists, the biomechanical approach of the rehabilitation engineer are blended with the vocational evaluator approach to give the client the necessary therapeutic physical capacity program with an appropriate vocational focus. The psychologist and occupational therapist are able to provide insights into the client's adjustment, and motivation, and enable the use of behavioral techniques such as contingency reinforcement, behavioral schedules, and pain management techniques which are incorporated into the work hardening program. Thus, the breadth of the program and the services available increase the probability of success for the client.

The earlier programs operated on funds from the State and Federal level. As these funds fluctuated and were reduced in some cases, the feasibility of providing long-term programs with expensive staff mandated a change. The work hardening programs of earlier decades reduced staffing. They were incorporated into the sheltered workshop model. The reemergence of the work hardening programs is based on the shift to private sector funding. The worker's compensation system and the long-term disability systems, not dependent on the political pressures of the Federal and State tax systems, have been able to support the new work hardening models of the 1980's. This is also due to the short term approach to treatment. The intensive staffing develops and implements the program on a 3-4 week schedule. Progress is measured in quantitative terms and monitoring is critical to be able to document progress. This is important for the legal implications in which all services in the highly litigated area of worker's compensation are involved.

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# PHYSICAL CAPACITY EVALUATION AND WORK HARDENING PROGRAMMING: THE CARLE CLINIC ASSOCIATION MODEL

VIRGIL ROBERT MAY

**ABSTRACT:** This paper describes the industrial rehabilitation system currently housed at Carle Clinic Association, and demonstrates the utility of the system's vocational evaluation and work hardening/adjustment programs.

The private-for-profit rehabilitation industry has been described as a system offering services analogous to those provided by state and federal systems (Diamond & Petkas, 1979; Lewin, Ramseur & Sink, 1979; Organist, 1979). However, unlike the public sector, the private sector service delivery system is placement oriented (McMahon, 1979), emphasizing short term vocational evaluations of transferable skills, court testimony, coordination of medical services and job placement (Diamond & Petkas, 1979; Lewin et al., 1979). Matkin (1982) concurred that the results of his survey of 174 members of the National Association of Practitioners in the Private Sector (NARPPS) demonstrated that the private sector emphasis is greatest in areas of vocationally oriented evaluation and job placement. Such an emphasis can be expected when considering the clientele served by the private sector (i.e., industrially injured, chronic low back or other orthopedic problem) and the objective of services offered; to return the patient to work in the most expedient way while operating within the appropriate legal framework (Workman, 1983).

The private sector is diversified in its work settings unique to the individual practitioner. For example, Workman (1983) noted the following as current work settings reported by members of NARPPS:

1. Cottage Industry: a counselor who operates from his or her own home or shared office space, utilizing an answering service for telephone messages and a clerical pool for typing services.
2. Regional Firm: A firm with as many as 50 counselors working in a region or state, with one to six offices within the region. This setting usually employs specialized employees, such as job placement specialists, marketing and administration staff.
3. National Firm: A large corpor-

ation with 100 to 1000 professional staff members, operating in major areas of the United States.

4. Insurance (in-house) Firm: A vocational unit established by the insurance company.
5. Ancillary Firm: Firms that provide ancillary services, such as work evaluations and job development services, to private rehabilitation vendors.

One setting that has been omitted and is unique to the private as well as to the public sector is the multi-medical facility (i.e., private-non-profit hospital or the private-for-profit medical clinic). Several hospitals and clinics have established rehabilitation programs modeling those in the for-profit sector, integrating an industrial rehabilitation package with the standard medical care system.

## Process

Carle's industrial rehabilitation concept is predicated on the philosophy of vocational evaluation and work adjustment services. Lynch (1983) described the vocational evaluation process as a formal attempt to collect occupational information in order to describe and predict an individual's vocational functioning level. In the private sector, this translates into determining the degree of limitation imposed by an event (work accident), and its implications for future vocational potential (Sink & King, 1983). Techniques employed to determine this degree of limitation usually involve a) interviewing, b) psychometric testing, c) work samples, d) situational assessment, e) job sample (site) evaluation, f) computer/electronics evaluation, and g) the Vocational Evaluation and Assessment of Residual Employability profile (Lesnik, 1983; Mason, 1983; Sink & King, 1983). Finally, Chandler (1983) noted the objectives of vocational evaluation to include:

1. Identifying an optimal outcome for the individual being served.
2. Identifying the functional competencies and functional disabilities of the individual, especially in terms of the optimal outcome for the individual.
3. Identifying the services necessary to overcome the functional disabilities which prevent attainment of the optimal outcome.
4. Reducing or eliminating the functional disabilities of the individual.

Work adjustment services emphasize treatment more than evaluation, and thus focus on improving an individual's ability to work and to relate to the demands of the work environment (Baker, 1983; Lassiter, 1983). These services emphasize behavior change through planning, delivering, and monitoring those services needed to facilitate such behavior changes necessary for the patient to return to work. Baker (1983) suggested that a work adjustment plan should include:

1. A description of the specific behaviors to be dealt with.
2. An identification of the specific work assignment or other environment to be used.
3. An identification of the specific treatment techniques to be used.
4. An identification of the specific persons or agencies who will be carrying out the plan.
5. Specific provisions for reviewing the plan and modifying it when necessary.

Private sector vocational evaluation and work adjustment services typically sustain one another such that one service is used in conjunction with the other. For example, Lassiter

(1983) noted that when a patient is being evaluated, that person is also undergoing adjustment. Similarly, when a patient undergoes adjustment, evaluation is also taking place. Baker (1983) added that functioning deficits should not be confirmed and neglected, but adjustment services should be implemented to define the major functioning problems and outline ways to resolve them, thus facilitating the return to work process.

## The Carle Clinic Model

### Vocational Evaluation

The evaluation phase consists of two basic steps: a) the initial interview (plan development) and b) implementation of the plan (Physical Capacity Evaluation and any other technique that may be suggested).

The initial interview consists of gathering and synthesizing medical and vocational data. Based on the patient's data input and the medical reports presented, rehabilitation plan goals are discussed and time lines given for obtaining specific goals. Additionally, a residual skills analysis with adjusted worker profiles is generated through the computer based Ability Information System. This system utilizes the Handbook for Analyzing Jobs technology to translate worker traits associated with jobs performed in the patient's work history to skill patterns which can be matched to other suitable jobs (Fry, 1982). The final report not only lists suitable jobs for the patient, but adjusted work profiles that account for any physical restrictions suggested by the physician.

A complete vocational evaluation may be recommended in the initial report, suggesting psychometric testing, work samples, or work site evaluations. Because this service is on an individual basis, not all patients will need an evaluation battery. However, all patients with work-related orthopedic injuries are required to undergo a Physical Capacity Evaluation (PCE), scheduled as soon after the initial interview as possible. This is due in part to the type of patient served by the program. Often, discrepancies exist between what the physician says a patient can do and what the patient says he or she can do (Lichtenstein, 1983). It is common to not have objective medical evidence to substantiate the patient's physical discomfort. The PCE is one attempt to add some level of objectivity when evaluating the patients complaints.

The PCE evaluation procedure interprets the patient's medical findings and physical functioning ability into performance potential for vocational development and placement activities (Harrand, 1982). More specifically, the PCE assesses the patient's total range of motion in all upper and lower extremities, to include active and passive flexion and extension ranges. The evaluation is administered by a physical therapist trained in this evaluation procedure, and performance outcomes are staffed by the rehabilitation team (physical therapist, occupational therapist, and the rehabilitation specialist).

It is essential that the PCE objectives remain consistent with the total evaluation program's goal and objectives (Harrand, 1982). Carle's PCE model notes the following objectives:

1. To assist the staff in making appropriate vocational recommendations in accord with the patient's physical potential.
2. To explore the patient's current functioning level and to determine if it is consistent with the medical findings.
3. To make recommendations for additional services if a need is identified (i.e., pain management programs, work hardening, physical therapy, or additional medical intervention).
4. To suggest the use of additional

evaluation techniques to assess questionable levels of physical capacity.

## Resources

Components of the PCE that assist the evaluating therapist in drawing conclusion from patient performance outcomes are referred to as resources. One primary resource is the job analysis. A job analysis in this setting can provide information regarding the tasks performed by the patient in his or her previous job, the work environment, and the tools used to complete all job tasks (Pati & Adkins, 1981). Such information can provide direction for the therapist when deciding what specific functional performance should be stressed, and answer specific referral questions posed by the rehabilitation specialist (Harrand, 1982).

Additional resources of the Carle Clinic PCE Model include:

1. Initial Vocational Rehabilitation Assessment Report: This report contains a total medical history listing current diagnoses, physician imposed restrictions, medications, vocational work history with an analysis of the patient's current job, and a summary of the rehabilitation specialist's recommendations. This information assists the evaluator with determining what the appropriate functioning level will be for each task evaluated.
2. Subjective Activity History: This involves the evaluator noting the patient's discomfort and pain symptoms as reported by the patient. Also, activities of daily living are discussed. This information allows the therapist to point out consistencies or inconsistencies with other findings (Harrand, 1982).
3. Performance of Tasks: The evaluator synthesizes information obtained as a result of performance following the Department of Labor's outline of physical performance demands. Specific activities assessed include lifting, carrying, sitting, kneeling, general mobility (crawling, reaching, climbing, and reclining), walking, balancing, running, jumping, repetitive stooping, reaching, and stacking while squatting. Each of these tasks are assessed with the use of work samples, as suggested by Harrand (1982).
4. Gross Muscle Strength Tests, Range of Motion Tests: These tests rely on the Cybex Evaluation System. This particular unit has the ability to test all lower and upper extremities, providing objective EMG readings comparing the impaired muscle group with the unimpaired muscle group. Deficits in one group vs. the other are demonstrated and mathematically confirmed. Cross confirmation of muscle function may be obtained through five tests measuring strength, power, power-endurance, isometric strength and fatigue. There is also a test that confirms malingering. Needless to say, all patients with chronic symptoms and having no confirmed medical findings are evaluated on the Cybex. Other patients may be evaluated at the discretion of the evaluator and rehabilitation specialist (Farmer, 1982).

## Work Hardening

During the weekly rehabilitation team staffings of individual patient's PCE results, a decision is made regarding what should comprise the patient's next event in the rehabilitation program. Usually, the patient is recommended physical therapy for specific muscle groups, to be administered in conjunction with a work hardening program. However, not all patients qualify for this program because of individual patient characteristics that may include type of injury, previous work and medical history, elapsed time post injury, etc.

Work hardening is used to assist a patient with developing a sufficient amount of physical stamina such that an 8 hour work day can be achieved with minimal discomfort and pain (Gregory, Whitlow, Levine & Wasmuth, 1982). This process involves simulating the patient's work activities of a job he or she is expected to return to, or of a job in an occupational category in which the patient has shown a strong interest. This program is administered by occupational therapists who are qualified to supervise patients in posture correction, strength and endurance development. The key to success in work hardening is the ability of the therapist to tailor the program to the physical restrictions of the patient. At Carle Clinic, this involves structuring the program to comply with the PCE results. Proper structuring will assure maximum output potential from the patient who in turn will receive the maximum benefits of the program through total compliance with the various instructional activities.

The program length usually encompasses a 40 hour, four week period. However, this time frame may vary across patients, with some requiring more weeks for completion. During the contracted period, weekly rehabilitation team staffings are held to discuss the patient's progress, and to discuss alternatives should progress be minimal. At the conclusion of the program, each patient undergoes a second PCE to assess changes in baseline performance scores. This information is submitted to the treating physician for release-to-return-to-work considerations. The rehabilitation specialist also uses the data to develop final return-to-work strategies regarding work setting and job type.

## Resourses

Carle Clinic's work hardening model utilizes various work adjustment techniques cited by Gregory et al. (1982). These techniques include:

1. Job/Task Analysis: Similar to its role in the PCE, the job analysis is essential in developing a sound work hardening program that is accurate in simulating the patient's expected employment setting. With the analysis in hand, the occupational therapist can structure the work place to offer a controlled setting.
2. Disciplinary Action: Because the work hardening program is simulated work for the patient, the patient responsibilities to the program mirror those in the actual work place. An unexcused absence results in docked benefits for the period missed. However, cooperation and support must be solicited from the compensating source. Usually, these sources are more than willing to cooperate.
3. Client Observation: The purpose of work hardening is two fold: a) to develop strength and b) to develop endurance. This is accomplished through increasing the weight load of objects involved in each task, or the number of repetitions required of each task. The occupational therapist observes the patient's physical behavior as the patient completes each task, and adjusts the weights and number of repetitions so that the patients continue to achieve maximum benefits from the physical activity exerted in each task.
4. Productivity Rate Feedback: The therapist will consistently provide the patient with progress reports as a means

for supporting and encouraging the patient to continue with his or her efforts. Physical change is not immediate, and the patient should be kept informed of his or her daily progress.

Other techniques cited by Gregory et al. (1982) may be employed on an individual basis. The four cited above are standard in the Carle model.

## Summary and Conclusion

Industrial rehabilitation programs are breaking new ground as more medical facilities accept these programs into their respective service delivery systems. Such settings offer the advantages of in-house referral sources, better case coordination through the centralization of services, the development of a team approach, and the availability of physical and occupational therapeutic services.

Physical capacity evaluations and work hardening programs are new entries in the milieu of the private rehabilitation sector. Ideally situated in the medical setting, these services offer a means to objectively evaluate the chronically injured patient in terms of physical abilities, and to develop a therapeutic treatment plan that utilizes standard work adjustment techniques proven to be effective in preparing handicapped persons for employment. Because the goal in industrial rehabilitation is to return the patient to work the market for PCE and work hardening programs will continue to grow and expand.

The business outlook for the traditional private rehabilitation sector may suggest a state of flux as more medical facilities accept the industrial rehabilitation model. More specifically, it can be expected that these medical programs will offer job placement and development services as well as the evaluation and therapeutic services now being developed, thus becoming aggressive competitors for the insurance and legal markets. The private practitioner is now challenged to address this potentially new competitor in a way that all parties will work cohesively for the benefit of the patient.

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# IDENTIFYING OPTIMAL WORKING CONDITIONS FOR PERSONS WITH LOW VISION - WHO IS RESPONSIBLE?

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**ABSTRACT:** This paper examines the strengths and weaknesses of having one person or a team address the issues of creating optimal working conditions for persons with low vision. It concludes that a team approach, with an evaluator serving as coordinator for the team will assure that vocational recommendations are incorporated into rehabilitation plans.

The vocational evaluation of persons with low vision is usually not complicated by the communication problems associated with hearing impaired persons or the physical limitation imposed by neuromuscular disorders. Yet the evaluator of persons with low vision faces a tremendous challenge which must be met with creativity, patience and perhaps most significantly, an open mind.

As the vocational evaluator prepares for the assessment of these individuals many questions arise - How will the evaluee read instructions? If the visual impairment slows their working speed will the norms be valid? How much can a worksample be modified without undermining the original purpose of the worksample, or is any information good information? The list is endless. Fortunately a review of the literature and contact with rehabilitation facilities demonstrates progress in the area of vocational assessment of the visually impaired. Psychometrics and worksamples have been designed and/or modified for visually impaired persons thus providing the means for vocational assessment of this unique population.

Equipped with revised tests, new norms, modified worksamples, assistive devices and high hopes, the evaluator frequently begins the process of evaluating low vision individuals only to be stopped by another obstacle. Though the referring medical information ~~is~~ often lengthy, complex and detailed, much of the information reads as a foreign language without a reference guide for translation into vocational terms. Quite often acuity is reported according to the Snellen Chart which is limited to describing acuity at a reference point of 20 feet. This information might not have any relevance to the sight requirements of a particular job. As Vanderkolk (1981) states two persons may have the same acuity but in reality function quite differently. Also, a low vision referral will not necessarily include a low vision exam. McCaa (1984) describes the sparse availability of this service in that only 43 states have low vision assessment clinics and of these states only 2 have 10 or more clinics. To further complicate the picture the evaluator often is in the position of helping an individual plan their vocational future without the benefit of a prognosis for future visual acuity. Given these limitations in referral information, the conscientious evaluator will often request additional referral information regarding fatigue factors, optimal visual reliance and prognosis (Currie, 1975).

As 75% of legally blind individuals have been shown to have some potentially useful vision, the evaluator may choose to assume the responsibility for identifying and maximizing this vision. However, both the evaluator and the evaluee may experience feelings of frustration over the limitations in adapting the environment of the assessment area for the individual needs of a low vision person. Vanderkolk (1981) suggests the need for individualized environments when he refers to low vision persons as having individual visual strengths.

Richterman and Aarons (1983) address the subject of varying conditions in terms of light intensity and color combinations utilizing a device allowing the visually impaired subject to control the light intensity and combinations of color contrast. They were able to demonstrate improved productivity in 50% of the subjects with tremendous benefit to a few subjects. There was no demonstrated correlation between diagnosis and chosen color combination and light intensity. Thus the need is again supported for individualized assessment of this type. Richterman and Aarons followed their study by making available a "Light and Color Work Sample" similar to the one used in the study. Evaluators have been provided with one method of assessing optimal light and color combinations of a work environment for individuals. Perhaps this is the beginning of a structured approach to assessing an individual's optimal working conditions.

Since an improved comfort level with regard to light intensity and color contrast was shown to have a positive effect on some visually impaired workers' productivity, could there be potential for additional manipulation of working conditions yielding even greater productivity increases? For instance, should each low vision individual be given the opportunity for exploring work schedules which best accommodate their fatigue factor? Can low vision aids significantly improve productivity (McCaa, 1984)? How important is work organization to the productivity and safety of a low vision person? Have the questions been researched? Richterman and Aarons (1981) point out that National Industries for the Blind was not able to find significant progress in the area of identifying needs and providing assistance for improving the productivity of low vision persons.

If the factors of light intensity, color combinations, work organization, fatigue, low vision aids, etc., are critical to optimum work performance of low vision persons, at what point in the rehabilitation process are these factors to be addressed and by whom? To what extent can low vision persons expect a work environment to be modified? Who should approach the potential employer regarding the environmental modifications?

The low vision specialist, mobility teacher, rehabilitation teacher, vocational evaluator, job placement specialist and rehabilitation engineer might all be logical persons to assume the responsibility for identifying optimal working conditions for low vision persons. Certainly the low vision specialist would have the technical skills for identifying and maximizing visual acuity with regard to a specific job. On the other hand the mobility teacher could probably eliminate some guess work pertaining to the best method of organizing a work station. He/she would also be an excellent reference for insuring a safe work environment. Some insight as to the functioning of the individual in activities of daily living could relate to the work site. This information could be provided by the rehabilitation teacher.

The vocational evaluator also appears a logical choice for these duties since this person compiles a report of recommendations for job placement. Yet the Rehabilitation Engineer has even more refined skills with regard to modifications of working conditions. And finally, there is the job placement specialist who is aware of the specifics of available jobs and maintains communication with potential employers.

Obviously the majority of the professionals working with low vision persons could have a significant input toward identifying and developing optimal working conditions. Perhaps an effective method for dealing with this question is to develop a structured plan by which the professionals could work together to achieve and assist the low vision person in identifying his/her optimal working conditions. The strengths of each professional could be integrated into a package assessment and job site modification.

The low vision exam is important but may not always be available. A listing of low vision clinics is available through the American Foundation for the Blind. While every effort should be made to obtain such an exam through one of these clinics there may be the need for vocational evaluators to have some basic training in and understanding of low vision aids. The evaluator might then be able to integrate several low vision devices in the evaluation process allowing the evaluee to have a prolonged period of experimentation with the aid. With regard to evaluation, Currie (1975) stated situational assessment is vital to understanding the visual functioning of the visually impaired. An essential component in the evaluation process appears to be an assessment environment which is controllable by the evaluee as well as the evaluator. The evaluator would seem to play a crucial role in the individualized exploration of work environments, conditions and comfort levels. The evaluator might also coordinate the sharing of information among and between the rehabilitation teacher and mobility teacher. In view of the often times filled schedule of rehabilitation engineers, the actual job/environmental modifications may need to be coordinated between the job placement specialist and the vocational evaluator. The job placement specialist might establish the rapport with employer while the evaluator provides technical assistance in the modification.

In summary, to state that one person in a rehabilitation team could or should assume total conditions for a low vision person would short change the low vision person from receiving the benefit of a team approach. On the other hand, to ignore the situation and never address the subject of optimal working conditions would again short change the low vision person. Therefore a team approach is suggested with the vocational evaluator serving as coordinator, since the vocational recommendations are formalized from their assessment.

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# VOCATIONAL EVALUATION OF BLIND AND VISUALLY IMPAIRED PERSONS

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**ABSTRACT:** The vocational assessment of visually impaired persons is extremely important because, whether it is done formally or informally, vocational assessment determines all that comes later in their rehabilitation. While much has happened to improve the quality of vocational assessment for blind and visually impaired persons, much yet needs to be done. This presentation overviews resources and projects related to the vocational evaluation of blind persons that are available or are being implemented through the American Foundation for the Blind (AFB), the Rehabilitation Education Program, at Mississippi State University, and The Rehabilitation Research and Training Center in Blindness and Low Vision (RTC-BLV) at Mississippi State University.

## Task Force on Vocational Evaluation of the Blind

In the Spring of 1983, the American Foundation for the Blind convened a group of persons involved in the rehabilitation of the blind and in vocational evaluation to look at the state-of-the-art in vocational evaluation of blind persons and what is needed to improve services. Through this and subsequent meetings it became clear that improvements in a variety of areas are needed. However, real data on the quantity, quality, and type of vocational evaluation services for blind persons is lacking.

Recommendations were made to AFB to form an official task force on the vocational evaluation of blind persons that would undertake a major state-of-the-art study to determine: the training needs of practitioners; the state-of-the-art in delivery of services; and the needs perceived to improve services.

AFB is presently funding this such a task force, and a major survey is being prepared that will be mailed to all agencies specifically serving blind persons as well as general rehabilitation facilities throughout the country - a total of some 5,000 surveys. Present timelines, provide for the development of a Final Report in the Summer of 1985. Subsequently the Task Force will use its survey data and other existing data to develop concrete proposals that will respond to the needs determined by field-based practitioners.

In the process of their deliberations, however, the task force has identified a number of needs and concerns related to the vocational evaluation of visually blind and visually impaired persons. These are listed below (Task Force on Vocational Evaluation of the Blind, 1983):

1. Training of (a) vocational evaluations in general agencies to do valid vocational evaluation

of blind person and (2) vocational evaluators to consider job modifications and adaptations in providing vocational evaluation of blind persons in need.

2. **Referral to vocational evaluation** Concern was expressed that (a) clients are not properly prepared for vocational evaluation, (b) that clients are referred who have not had sufficient background -- prevocational training, vocational exploration, etc. -- to benefit from vocational evaluation; (c) and that rehabilitation counselors do not provide adequate referral information nor ask relevant questions to be answered.
3. **Communication of vocational evaluator and rehabilitation counselor** Concern was also expressed that vocational evaluators do not relate results to actual labor market conditions.
4. **Areas in which vocational evaluation needs to be improved.**
   - (a) Assessment of learning style
   - (b) Assessment of vocational aptitudes
   - (c) Specific job skills assessment for training on employment in professional, technical, managerial, and skilled professions.
   - (d) Evaluation of clients for their full potential as well as most immediately available work options.
   - (e) Effective individualized, prescriptive reports, and recommendations.
   - (f) Occupational information and exploration during vocational evaluation.
   - (g) Analysis of job modifications needed as part of vocational evaluation.
   - (h) Vocational assessment/evaluation involved in schools for the blind and public schools.

## Training in Vocational Evaluation of the Blind

Few resources have been available to date that give training specifically related to the vocational evaluation of blind persons. However, in the last two years, Mississippi State University and Auburn University have developed graduate emphasis in this area. Also, the Rehabilitation Research and Training Center in Blindness and Low Vision and Continuing Education programs at Auburn University have been providing in-service training.

Mississippi States program is a unique a graduate program entitled Vocational Specialist for the Visually Impaired that is designed to train professionals to function as Rehabilitation Counselors, Vocational Evaluators, or Placement Specialists trained specifically to work with blind and visually impaired persons. This program is offered through the Rehabilitation Education Program at Mississippi State University (P.O. Drawer GE, Mississippi State, MS 39762, (601) 325-3331) and is a unique interdisciplinary training program that involves 51 semester hours - 42 hours of course work and a 9 hours, full semester internship. Courses include training in the following skills as they relate to blind persons: counseling, vocational assessment, medical information, job placement, introduction to orientation and mobility training, work adjustment and personal-social adjustment. The program emphasizes classroom and experiential learning and connection with research and training activities. Through cooperative arrangements, staff of the Research and Training Center in Blindness and Low Vision teach in the program and some Counselor Education staff are involved in Research and Training Center projects.

## Rehabilitation Research and Training Center Projects in Vocational Evaluation of the Blind

The Rehabilitation Research

and Training Center in Blindness and Low Vision is engaged in three projects related to the vocational assessment of visually impaired persons as consistent with the career development emphasis of the Center. These projects and resources are reviewed briefly below.

### Work Samples and Visually Impaired Persons

A comprehensive review of vocational assessment and utilization of work samples with visually impaired persons was published through the R & T Center in 1984 (Peterson, 1984). The monograph was based on comprehensive literature review, a survey of manufacturers of commercial work sample systems, and a national survey of rehabilitation facilities for the blind. It includes information on the state-of-the-art vocational evaluation of the blind, employment of blind persons, approaches to assessment and testing of blind and visually impaired persons, and commercial and locally developed work samples. Two basic conclusions from this review, however, are: (1) there is a need for valid assessment samples that assess the occupational skills and potentials of visually impaired persons for skilled, technical, and professional positions; (2) improved assessment techniques are needed for the multi-handicapped blind. These are consistent with present issues identified by the AFB Task Force.

### Training Opportunities for Visually Impaired Persons (TOP-VIP)

This project involves the development of occupational assessment materials in five technical or professional areas: (1) management; (2) counseling social work; (3) allied health; (4) computer programming; and (5) sales. Assessment materials are presently being developed that will focus on the characteristics needed to successfully train in these fields. The assessment model used in business and industry is being modified to provide a series of occupational exploration and assessment experiences that can assist a visually assessment experiences that can assist a visually impaired individual with personal decision-making and can provide a valid assessment of important occupational dimensions. The primary focus of these materials will be the development of recommendations related to vocational training. Additionally, TOP-VIP will provide an overview of a total vocational assessment approach for recommending training in higher level occupations. Materials are expected to be published in the fall of 1986.

### Modification of the Vocational Education Readiness Test (VERT)

The VERT (Thomas, 1983) involves a series of test originally developed at the Research and Curriculum Unit in Vocational Education at Mississippi State University to assess handicapped students in secondary school for entrance into vocational education classes. Presently, the VERT consists of tests in eight areas: (1) auto mechanics; (2) basic wiring; (3) carpentry; (4) clothing (sewing); (5) masonry; (6) plumbing; (7) quantity foods; and (8) welding. Modifications are presently being made in selected tests so that they can more effectively be used by vocational evaluators who work with visually impaired persons. Each test is composed of four assessment components: (1) performance sample in which actual work tasks are performed using tools of the trade; (2) tool identification; (3) vocationally related vocabulary; and (4) vocational related computation and measurement. The adaptation of these instruments is presently in process.

### Electro-mechanical Work Task Units

The Rehabilitation Research and Training Center in Blindness and Low Vision (RRTC-BLV) and the Rehabilitation Division of the National Industries for the Blind (NIB) have cooperatively developed several work samples and training tools related to manipulative skills and industrial assembly. NIB developed these work tasks units over the last few years at Royal Maid Association for the Blind in Hazlehurst, Mississippi. They are currently in use as evaluation and training tools. The RTC-BLV project involved the improvement and standardization of existing work task units and the development of two additional units. Specifically, standardized manuals have been developed that are written in the format recommended by the Materials Development Center at the University of Wisconsin, Stout. Reliability and validity studies are currently being conducted. Reliability studies are being conducted using a test-retest methodology with a total of 30 subjects. The length of time between tests and retest ranges from 5 to 10 days. Validity studies correlate the scores on work task units with sheltered industry production rates and scores on other work samples. Data is being collected at the following field sites: Addie McBryde Rehabilitation Center for the Blind, Jackson, Mississippi; Royal Maid Association for the Blind, Hazlehurst and Tupelo, Mississippi; Regional Rehabilitation Center in Tupelo, Mississippi, and the Louisiana Association for the Blind, Shreveport, Louisiana.

The task units provide an assessment of various manipulative abilities and work behaviors. They are intended primarily for use with severely handicapped blind persons whose occupational objective is sheltered employment. The administration of each unit involves: (1) demonstration of the task; (2) practice for the client until the task is performed correctly on these consecutive trials; additional practice of ten minutes; and (3) performance and/or production while the task is done as quickly and as precisely as possible -- usually for 50 minutes. A sighted standard has been developed for each work task unit based on the scores of five average, sighted workers. In most work task units, an electro--mechanical work pace reinforcer gives auditory feedback when a standard is not met. Below, the work task units are listed and summarized.

1. FINE FINGER DEXTERITY WORK TASK UNIT

Assesses: Kinesthetic memory
Bi-manual coordination
Finger dexterity
Frustration tolerance

Task: Assembly involving: insertion of a plastic form, pins or corners, T-bar in middle, place in bin.

Feedback: Buzzer sounds when task is not completed correctly in the allotted time.

Sighted Standard: 17 seconds

2. FOOT OPERATED HINGED BOX WORK TASK UNIT

Assesses: Hand-foot coordination
Bi-manual coordination
Finger dexterity

Task: Place nut on a bolt, place in hinged box, automatic counter.

Feedback: Buzzer sounds when task is not completed correctly in the allotted time.

Sighted Standard: 5 seconds

3. HINGED BOX WORK TASK UNIT

Assesses: Tactual perception
Material control
Bi-manual coordination
Frustration tolerance

Task: Place card in plastic bag, open box and place inside, auto counter.

Feedback: Buzzer sounds when task is not completed correctly in the allotted time.

Sighted Standard: 8 seconds

### 4. INDEX CARD WORK TASK UNIT

Assesses: Bi-manual coordination
Finger dexterity
Frustration tolerance
Memory for sequence of operations

Task: Pick up 2 cards, push to divider and then up until hear a "click". Right card to right, left to right position up another.

Feedback: Buzzer sounds when task is not not completed correctly in the allotted time.

Sighted Standard: 4 seconds

### 5. MULTIFUNCTIONAL WORK TASK UNIT

Assesses: Bi-manual coordination
Finger Dexterity
Kinesthetic memory
Ability to work with others

Task: Fill 168 holes with vials and assembled materials (nuts and bolts). This is done cooperatively with other clients. An observation sheet of work behaviors is used.

Feedback: Buzzer sounds when task is not completed correctly in the allotted time.

Sighted Standard: 4 seconds

The manuals of the work task units are presently available, for $15.00, through the Rehabilitation Research and Training Center in Blindness and Low Vision, Post Office Box 5365, Mississippi State, Mississippi 39762.

## Resources in Vocational Evaluation of the Blind

### Training

1. Vocational Specialist for the Visually Impaired

Rehabilitation Education Program
Mississippi State University
P.O. Drawer GE
Mississippi State, MS 39762
(601) 325-3331
Contact: Michael Peterson, Director

2. Vocational Evaluation for the Blind and Deaf

Department of Special Education and Rehabilitation
Auburn University
Auburn, AL
Contact: Randy McDaniel
Graduate Coordinator

3. Rehabilitation Research and Training Center in Blindness and Low Vision (RRTC-BLV)

Mississippi State University
P.O. Drawer GE
Mississippi State, MS 39762
Contact: Martha Bagley
Training Director

### Research and Development

1. Task Force on Vocational Evaluation of the Blind

American Foundation for the Blind
15 W. 16th Street
New York, NY 10011
(212) 620-2000
Contact: Frank Simpson
Employment Specialist

2. Rehabilitation Research and Training Center in Blindness and Low Vision

Mississippi State University
P.O. Drawer GE
Mississippi State, MS 39762
(601) 325-2001
Contact: Steve Machalow
Research Director

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# THE VOCATIONAL EVALUATION OF HEAD INJURED PATIENTS

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**ABSTRACT:** Each year 400,000 to 600,000 persons sustain a severe traumatic head injury. As a result of technological advances in medicine and rehabilitation, increasing numbers of head injured persons are surviving, yet 30,000 to 50,000 a year continue to manifest disabilities severe enough to preclude a return to a normal life (U.S. Department of Education, 1981). A significant portion of this group consists of adolescents and young adults involved in automobile, motorcycle or sports accidents (Kalsbeck, McLaurin, Harris, & Miller, 1980). One of the most difficult challenges these individuals face is entering into the workforce.

In recent years, there has been an influx of individuals with traumatic head injuries seeking vocational services. These individuals pose a particular challenge for the vocational evaluator accustomed to working with the physically disabled because of the combination of physical, cognitive, and behavioral impairments associated with head injuries. The complexity of this disability has led vocational evaluators to question the efficacy of standard vocational assessment procedures. This paper addresses the role of vocational evaluation in the rehabilitation of the head injured patient, focusing on the limitations of traditional assessment procedures, and the need for alternative means of evaluating this population.

## Functional Limitations

An individual who has suffered a traumatic head injury is typically left with a complex set of deficiencies. Unlike other diseases of the brain (i.e., Stroke, brain tumor) that result in localized brain damage and predictable functional consequences (Lezak, 1983), a head injury results in damage to diffuse areas of the brain. As a result, each patient presents a unique set of symptoms and functional deficits which contributes to the difficulty in working with this population (Anderson, 1981).

The multiplicity of deficits for the head injured are noted in physical, cognitive, and behavioral functioning. In addition to hemiparesis, physical impairments may include muscle spasticity, seizures, receptive and/or expressive aphasia, visual and sensory deficits, and reduced bowel and bladder control (Anderson, 1981).

Memory impairments are the most frequently cited cognitive deficits by head injured patients (Benton, 1979). Other cognitive deficits that interfere with vocational functioning may include decreased attention span and concentration; increased distractibility; impaired learning ability; slowing in the speed of information processing, reaction time and decision making; diminished abstract reasoning; and decreased generalization of ideas and tasks (Benton, 1979; Long & Webb, 1983).

Cognitive limitations and disturbances in social behavior have a strong negative impact upon returning to gainful employment (Najenson, Grosswasser, Mendelson, & Hackett, 1980). Following a head injury, changes in personality and temperament which impact on social behavior are often noted. The head injured patient may experience fluctuations in affect and mood (including depression and euphoria), lowered tolerance for frustration, and easily succumbs to fatigue. In addition, increased egocentricity results in a diminished awareness of social conventions, sensitivity to others' feelings and feedback concerning their own actions. Further, many head injured patients will experience difficulty in spontaneously initiating purposeful activities and planning for the future (Benton, 1979; Lynch, 1983).

A major obstacle for the vocational evaluator is the head injured patient's lack of awareness of his/her current deficits (Rosenthal, 1983). Commonly, they perceive themselves functioning as they had prior to the injury. This lack of awareness is much a function of cognitive deficits as psychological defenses such as denial. In general, the personality and behavioral changes experiences by the head injured patient are a result of pathology to specific areas in the brain, complicated by the psychological aspects of dealing with the disability.

## Vocational Evaluation

It is helpful to conceptualize two distinct, but related, phases of vocational evaluation during the rehabilitation process for the head injured patient. The first phase ideally begins while the patient continues to receive physical, occupational and speech therapies. The patient should be generally oriented to the environment and capable of performing purposeful activities for short intervals of time. During this time, the purpose of vocational evaluation is to obtain and provide information to the interdisciplinary rehabilitation team about the types of skills which would be necessary for the patient to return to his previous level of functioning in work or school, and to allow the patient an opportunity to practice these or related activities. This phase of vocational evaluation is most appropriate for patients who have had a previous work history.

For example, a 32 year old mailman sustained a head injury resulting most notable in left hemiparesis, short term memory deficits, inappropriate affect, and depression. Of significant importance to his rehabilitation was his difficulty in recognizing how the exercises performed in physical, occupational and speech therapies would assist him in returning to work as a mailman. He often became disruptive and refused to participate in therapies. When the vocational evaluation began, this patient was repeatedly given tasks related to mail sorting, beginning with sorting titles by color and progressing to sorting letters and packages. He was motivated to perform these tasks as they were directly related to his job. The other therapies began to incorporate job-related tasks into their routines which the patient readily performed. The patient eventually returned to work as a mailman.

The second phase of vocational evaluation should begin once the client has received maximum benefit from the physical rehabilitation and cognitive remediation programs (see Gianutsos, 1980; Pollack, Kohn, Miller, 1984 for a description of cognitive remediation). The purpose of this phase is to assess residual vocational assets and limitations, and provide recommendations for competitive employment or an alternative placement. Before beginning the evaluation process, the vocational evaluator must consult with the interdisciplinary team in order to understand the combination and degree of physical and cognitive deficits. Once this information is obtained, the evaluator can design and evaluation program which is tailored specifically to the individual needs of each head injured patient.

As with other populations, present skills, capacities for new learning and work behaviors are of major consideration during the vocational evaluation. The process is complicated, however, by the head injured patient's myriad of cognitive deficits that result in difficulties in transferring adaptice strategies and behaviors from one context to another. The presumed integration of skills and aptitudes and generalization of other contexts as assessed through aptitude testing and work sampling frequently does not occur for the head injured patient (Silver, Lakin, Ross, Rattok, Thomas, Diller, & Ben-Yishay, 1982). Thus, traditional testing measures generally are weak predictors of work potential.

For example, a head injured patient may successfully be able to file 3" x 5" cards in alphabetical order. However, it can not be presumed that this patient would be capable of working as a file clerk. The significance of limitations such as hemiparesis, distractibility, or poor organizational skills exhibited in an actual work situation, may not have been apparent during the work sampling. Conversely, a patient with aphasia may not be able to complete an adding machine work sample involving written instructions, but may be able to work as an office clerk using an adding machine where instructions are given verbally. Finally, a patient may have average verbal and numerical aptitudes as demonstrated by paper and pencil aptitude testing. However, short term memory deficits may preclude his ability to enter into occupations which would incorporate these aptitudes. The aptitude testing alone would not be able to demonstrate the effects of such memory deficits.

In addition to aptitudes and skills, work behaviors displayed during the structured testing situation may not be evidenced consistently in the actual work setting. The patient may display appropriate work behaviors in a quiet, nondistracting setting when tasks are presented one at a time the patient's work behavior may deteriorate, though, when placed in a noisy work environment with many co-workers in close proximity and several work duties which are presented at the same time.

## Assessment Techniques

Due to the limited value of standard assessment procedures, a creative, individualized approach is needed for a formal assessment of specific work skills and learning potential. The evaluator must determine not only whether the head injured patient can perform certain tasks within acceptable time limits, but also the manner in which new information is learned, whether the patient can resist distractions and stay on task, and whether the performance can be repeated. In addition, the evaluator should be cognizant of compensatory strategies (i.e., memory aids) that the patient might employ in order to successfully complete tasks. If the patient does not use compensatory techniques, the evaluator can assist the patient to develop strategies which might enhance his/her work performance.

Standardized work samples are effective in evaluating skills and learning potential when used in a flexible, nonconventional manner. Care must be taken, however, when interpreting the results of the patient's performance since the normative data associated with each work sample is rendered invalid with the deviations from the administration protocol. Therefore, close observation of the patient's performance is crucial in order to assess his/her learning potential.

A detailed case example will demonstrate the use of modified work samples in assessing the vocational capabilities of head injured patients:

A 19 year old head injured patient was given the Computing Postage Work Sample of the JEVS Work Samples. The patient was unable to complete the work sample because he had difficulty comprehending and performing the multi-step written directions. This appeared to be the result of cognitive impairments including poor organizational skills, short term memory deficits, distractibility, and limited frustration tolerance.

The evaluator assisted the patient by reading the instructions to him and helping him to devise a simple flow chart to help him remember the order of the steps required to complete the task. Next to decrease the likelihood of the patient becoming frustrated, the evaluator demonstrated each step of the tasks and had the patient repeat each step on his own. In approximately three hours, the patient was able to follow the flow chart independently and successfully complete the task. Although time consuming, the flow chart was invaluable in assisting the patient to compensate for his distractibility, poor organizational skills, and short term memory deficits. The patient was able to repeat his performance the next day with minimal assistance. By the third day, with the use of the flow chart, he was completing the tasks independently.

The evaluator was able to assess the types of specific work skills that the patient was capable of performing and devise an effective method for the patient to learn tasks while compensating for cognitive deficits. This information was invaluable when placing the patient in competitive employment.

As stated previously, work behaviors displayed during a structured vocational evaluation may not be evidenced consistently in a less structured work setting. Therefore, the evaluator should not rely solely on information obtained during a traditional vocational evaluation in order to predict work behaviors on the job. Rehabilitation facilities are beginning to incorporate work tryouts into the vocational evaluation of the head injured patient (Musante, 1983; Silver et al., 1982). An extended evaluation in an actual work setting allows the evaluator to conduct repeated evaluations of behaviors and skills in order to assess changes in work behaviors and the patient's potential for learning. During this time, the evaluator can help the head injured patient devise compensatory methods for completing tasks and modifying behaviors which would interfere with successful job placement.

At Kessler Institute for Rehabilitation in New Jersey, head injured patients have the opportunity to volunteer for approximately twenty weeks in a department within the hospital which reflects their interests and work potential. Such departments may include dietary, housekeeping, maintenance, medical records, purchasing, or clerical services. The patient works under the supervision of an employee in the department. Before beginning the work tryout, the patient and the supervisor sign a "Work Agreement" detailing a rationale for the work experience, work behaviors expected on the job, and an outline of job responsibilities.

During the work experience, the supervisor completes repeated evaluation reports of the patients's work behaviors and job performance. The evaluator, in collaboration with the supervisor, assists the patient to design techniques to compensate for cognitive or physical limitations in order to improve job performance. Also, the patient receives counseling to incorporate more appropriate work behaviors into the work setting. By comparing evaluation reports, the patient is able to objectively review his/her progress during the work tryout and note areas that require additional improvements.

After the completion of the vocational evaluation and work tryouts, recommendations are made for the patient to begin working in either a competitive job or an alternative placement (i.e., sheltered employment, volunteer position). Evaluation services should not end at the time of placement, but should continue with the assistance of the new job supervisor to evaluate patients adaption to the work setting and job duties.

## Conclusion

Each head injured patient presents a unique array of physical, cognitive, and behavioral limitations which impacts strongly upon his/her vocational functioning. Traditional methods of evaluating work potential (i.e., aptitude testing and work sampling) have proven to be of limited value when assessing this population. Instead, a creative and individualized approach is needed for the assessment of a head injured patient's work skills, behaviors, and learning potential. This includes flexibility in the use of work samples and extended work tryouts.

The role of the vocational evaluator with the head injured population extends beyond assessment. The evaluator also must help the patient devise compensatory strategies to complete job tasks and develop appropriate work behaviors. In order to preform the dual roles of assessment and remediation, special personal qualities are demanded of the evaluator; notably good problem solving skills, flexibility, and emotional sensitivity. Equally important, the evaluator must possess a thorough understanding of the multiplicity of deficits presented by head injured patients and their impact upon work functioning. Specialized training consisting of formal coursework, in-service seminars, and supervised work experiences with head injured patients is strongly recommended for all vocational evaluators working this population.

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# PREVOCATIONAL EVALUATION: A MIND SET OR A PROCESS

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**ABSTRACT:** Students born with disabilities and students with developmental problems often experience difficulty in obtaining work and adjusting to post-school employment. Lacking proper help, treatment, or training, many will remain unemployed or be underemployed. In addition, habilitation for many in these groups is primarily a learning process. For these reasons it is important that job-related problems be recognized early and that, at the proper time, they be appropriately dealt with. This paper deals with the limitations of a single focus approach to evaluation and a developmental approach to prevocational evaluation in school setting.

## Assessment

Historically, prevocational evaluation has focused on older youth with special vocationally related needs. Results have been positive as students have been helped to make more effective post-school decisions, plans and adjustments. Sponsors of vocational evaluation have been criticized, however, for this late "one-shot" approach. The approach tends to ignore maturation and potential developmental efforts and it allows a "mind set" to develop for each student; even when helpful it still provides too little too late. A better approach for special needs students would usually be prevocational evaluation of a developmental nature. In a developmental approach, integrated with career education, even younger students would, or could, be evaluated with selected aspects of the world of work kept in mind. An advantage of early evaluation would be that many years of school effort could, if necessary, focus on work related remedial efforts. As a result, the prevocational evaluation and career education efforts could become a team effort in a developmental process rather than a stable prevocational or vocational plan of action.

Some schools have responded to special student problems by introducing vocational rehabilitation specialists into their programming. These specialists are, by training and experience, more familiar with overcoming or circumventing disabilities and with helping disabled people to enter into and adjust to the labor market. A solution to student problems in these schools is a developmental prevocational evaluation, that over time, brings together, in team, special students, parents, teachers, and rehabilitation specialists. The team members study the student holistically; collect, analyze and synthesize work-related data and make school/work related recommendations.

A proper context for prevocational observations and evaluations is the school setting, which now has a vocational flavor analogous to that found in career education. In this context, students are provided a learning environment and a set of goals which attempt to relate their total education to the world of work. As learning situations become more work-oriented, both the students and the teachers begin to recognize work-related problems. In addition, the rehabilitation specialist and/or the specially trained teacher will begin to identify work-related learning activities that will help solve the work-related problems and overcome barriers to post-school adjustment and success.

## Process

Prevocational evaluation measures the existence of and potential for the development of work skills and related work behavior by students with special needs. (Adapted from VEWAA glossary 1983). The process of assessment (and related treatment) varies as students mature. Older students in prevocational evaluation are monitored and may be offered special training. If vocational problems persist in older students they may be referred to a vocational evaluator for a comprehensive vocational evaluation. Work related assessment and work adjustment with younger students will differ from that with older students: primarily, assessment will be more general in its focus. The results of assessment with this group will be less reliable and prevocational evaluation at younger ages will be more concerned with the development of a "work personality."

## Tools

Most vocational assessment tools are more effective with older students where they measure, or attempt to measure, factors which have been closely defined; these critical factors can be observed or identified at the point of contact between the assessor and the assessee. The evaluator is then usually able to reflect this information against norms or other information of a historical nature. As a result, select predictions can then be made about the vocational future of the person being assessed. Some of these predictions have been fairly valid and reliable, however, the degree of accuracy decreases with the breadth of the measurement. If these prevocational evaluation tools are relied on too much with young students, the predictions will be poor and the school planning will tend to be very narrow and inflexible. If prevocational evaluation does not go beyond the use of one or two special instruments any related school programming may result in a mind-set that is not helpful for a students. A better choice is a dynamic evaluation process and treatment program that develops over the school years.

## Dynamic Prevocational Evaluation

The major premise of this paper is: vocationally related problem recognition and treatment is, and ought to be, a continuing process throughout a student's school years. A vocational diagnostic and treatment team has the potential to recognize many early subtle indicators of future school and work problems. The team, under a work-oriented leader, can screen, plan appropriate in-depth and extended assessment, schedule follow-along assessment and effect meaningful and appropriate work-related learning activities. This team can provide or refer to high priority special programming for the special students. The team will operate most effectively when becoming economically productive is a major long range objective for special education, vocational education, prevocational programming and the students.

Comparisons are an important aspect of the dynamic prevocational process. Students with disabilities or critical job-related limitations are able to compare themselves with others who have succeeded on specific jobs. School planning and counseling can then ask about "what to do next". Students are also able to monitor their own job or work related growth and development over time.

Functional assessement, a concept important in vocational rehabilitation, is helpful in considering dynamic prevocational evaluation. First we will look at a definition: Functional assessment is "the measurement of purposeful behavior in interaction with the environment which is interpreted according to the assessment's intended uses." (Halpern and Fuhrer, 1984) Vocationally oriented rehabilitation specialists in school settings must be concerned with and knowledgable about or skilled in all key elements of this definition as they relate to students with disabilities and to work. Teachers, too, consider the same elements of functional assessment but they do this in relation to more general life and social goals and to teaching and learning activities. As a result the tasks of the special vocational team becomes one of bringing together the specialists and the teachers who can then provide long range work-related diagnosis and treatment with special students. The process begins with student problem recognition and classification.

In summary, recognition of student problems is much easier when the evaluator knows what to look for, the proper context in which to do the looking and how to make valid comparisons of student characteristics with significant work factors. It is important also that the school evaluator and direct-contact school staff know how to relate learning and learning activities to important work factors.

## Program Introduction

Prevocational evaluation is almost always employed too late in a student's educational career to enable full utilization of educational resources in vocational preparation. Currently, prevocational evaluational and/or prevocational training begins when the student enters the high school. The student's age is usually 14 or 15 and, at best, this gives the students six years to obtain the skills necessary for employability since many students choose to leave high school before their 21st birthday and, thereby, cut down on the time to train for employability.

Prevocational evaluation has high potential for use in the assessment of and preparation of disabled students for work. The assumption is that prevocational evaluation will help students to become more effective in self-assessment, in life and career planning and development and in specific vocational and vocationally related planning, decision-making, education, special preparation and employment. These potentials have, however, generally not been realized even through pre-vocational evaluation is available in numerous school settings. It has not been fully embraced with some of the reasons for this slow acceptance appearing to be systemic and as follows.

The results of prevocational or vocational evaluations are frequently not fully or effectively utilized in planning a student's educational program. In some cases, the reports may not even be available to those charged with development and implementation of the student's educational plan.

The concept of prevocational evaluation as a process is often misunderstood by both educational and rehabilitation personnel. For instance some feel that a prevocational evaluation provides definite answers to all possible vocational planning questions. Others use the results as the only information in vocational planning rather than as just one part of a multi-faceted and life-long vocational planning and developmental process.

Collection of information about the student and the relating of this information to work comprises a significant portion of the prevocational evaluation. During the school years, teachers, other school personnel, and parents provide often overlooked or underutilized vocational information about students. When this valuable information is analyzed and applied in conjunction with consultation by qualified rehabilitation counselors or vocational evaluators, the result can be a more fruitful use of the educational years in the vocational preparation of students with disabilities.

### The Utica Approach

A major objective of vocational rehabilitation, of special education and of vocational education special programming in the Utica, New York school system is to help individuals with handicaps to later become as economically productive as possible. Prevocational evaluation as it occurs in the Utica school system supports this objective with younger students to:

1) Facilitate educational and vocational planning
2) identify vocationally related strengths
3) relate these strengths to job clusters and categories
4) identify deficits and weaknesses in job related skills, knowledges and behaviors
5) analyze limitations and deficits in terms of vocational goals and prescribe training goals and work related activities which will help to make the student work ready
6) monitor student goals and functioning as they progress toward vocational goals.

Older students, especially those with complex and unsolved vocational problems are referred for more comprehensive vocational evaluation. In the lower grades of the school during prevocational evaluation and preparation more emphasis is placed on the following learning related activities: general work orientation and awareness, relating school tasks and situations to work tasks and situations, and relating career exploration to assessment experiences.

The model described and illustrated in this paper attempts to refocus the way in which prevocational evaluation is perceived and used in the school setting. Early screening, realistic expectations and multi-disciplinary team efforts are critical to this model. In this model:

1) Prevocational evaluation of adolescents and children can provide only a glimpse of initial patterns of vocational strengths and weaknesses. This evaluation should not be viewed as other than a rough, early view which can suggest immediate remedial measures, and future work-related general questions and general school planning.

2) Prevocational evaluations during the elementary years help students and parents to develop more realistic expectations. When students and parents are helped to understand, at an early age, the requirements for broad occupational areas, more student self-assessment and self-direction will be possible.

3) A multi-disciplinary team effort will help to make the prevocational evaluation most effective. The team may include specialists from the disciplines of rehabilitation counseling and/or vocational evaluation, school psychology, school counseling, social work and work adjustment. It must also involve the parents and student, where appropriate, as team members. The major team members may vary from setting to setting. The following members are, however, essential with children experiencing developmental problems: the special education classroom teacher; an administrator; the parent; and the rehabilitation counselor and/or vocational evaluator. These team members can ensure that the results of the initial prevocational

evaluation are incorporated into the student's home life and educational plan and provide a stronger framework for future vocational endeavors.

Parents as part of the planning team gain realistic expectations of job potential. This can lead to their expecting a son/daughter to develop a sense of responsibility through performing needed household chores. Although this principle holds for all children, it is almost an imperative for the child with a developmental disability. Without these expectations and responsibilities, there is little probability of later success in the work place.

In this model of prevocational evaluation, students and parents are included as active participants in the initial stages. Students are observed by team members and parents in regular classrooms, in extra-curricular activities, in prevocational activities and in other specially structured activities within the school setting. The observation period may vary in length depending on how the activities are structured. For maximum efficiency and minimum interference with other school programs, the intensive part of this model should probably not total more than 3 days over a 2-month period. The following questions form the focal points of the observation and later team meeting:

1) Will the normal course of academic preparation, available in the school, prepare this student for employment (competitive or otherwise)?
2) Given this student's physical and intellectual potential, what occupational areas are most possible and what occupational areas are least possible?
3) What, if any, changes in a student's educational program are necessary to increase the probability of success in competitive employment?
4) What behavioral changes other than normal maturation will be necessary to enable this student to obtain, maintain and find satisfaction in a job?
5) What kinds of related activities can parents and students engage in at home to increase employability?
6) What are the labor market trends in the community?
7) What are the family's plans for future residence? For example, many parents of Down's Syndrome children are retiring at the same time their children are completing school.

The intensive part of the prevocational process should optimally occur during the elementary years, probably around ages 9 and 11. In this way, the student's school pattern will already be sufficiently established to provide good information yet there will be sufficient time for remedial or refocusing efforts to positively affect the student's educational future.

The process would probably require a 1 to 2 week commitment and effort each year from school staff and rehabilitation staff. This early intervention would screen the student once during the pre-teen years.

The student's next involvement may well be with a more formal and comprehensive vocational evaluation during the adolescent years. At this stage, the student would optimally also be involved in summer work experience programs. There is a good probability that the results of the later evaluation would be positively influenced by the early intervention efforts.

The team effort which included parents, students, and classroom teachers would already have helped in: (1) the delegating of responsibilities to each team member and (2) ensuring ownership of the educational plan and its implementation by all interested parties. The team effort combined with prevocational evaluation in a school setting is pro-active; it helps to make the educational process even more flexible and developmental. An additional and important note at this point is that the time allocation be state vocational rehabilitation staff could easily be justified by the probability of a more vocationally feasible referral in the future as a result of this early intervention.

### Utica Case Summaries

Following are three hypothetical case summaries to illustrate and help define the model.

A. Joshua is a 10-year-old student who attends public school classes for the moderately mentally handicapped. He is not independent in many activity of daily living skills. Joshua seems somewhat clumsy around the classroom and doesn't willingly participate in recreational activities with his classmates.

A prevocational evaluation suggested that Joshua should receive further evaluation due to obvious perceptual motor difficulties. Adaptive physical education, occupational therapy and physical therapy have since been instituted to improve coordination and balance. A significant decrease in classroom "clumsiness" has resulted. The student sometimes participates willingly in recreational activities.

During the team meeting which included the parents, the student's apparent dependency in daily living skills was brought out by the teacher; the student neither dresses himself nor attends to his own hygiene needs. After discussion, the parents admitted that they felt they might be doing too much for Joshua. A plan was developed in which the parents agreed to help Joshua learn to do more for himself. Joshua was also to be held responsible for chores around the house.

Joshua's teacher reports that his general level of self-confidence and his relationships with his peers seem to have improved in the year following the evaluation team meeting.

B. Jean is a 10-year-old regular class student with average to above average intellectual ability. Her disability is cerebral palsy, affecting all four limbs and causing a significant speech impediment. Her writing is barely legible and writing takes her much longer than is required by her peers. Jean doesn't like school very much and she seems unable to keep up with her peers in class.

After a prevocational evaluation and an occupational therapy consultation, Jean began using a computer with a word processor for much of her written work in school. At the same time, Jean was taught how to use the computer to help her with mathematics lessons. Special software helped her to do math drills with minimal input and increased learning.

Jean's family was so impressed with Jean's interest that they bought her an inexpensive home computer. Two things have occurred which have changed the way Jean views school: 1) her written work doesn't take as long and is neater in appearance; and 2) Jean has learned more about computers and is able to impress her classmates with a positive skill.

From a vocational standpoint, Jean will be better prepared due to her continually improving skill in using computers for written communication and learning. Her writing would never really have been functional in a work setting.

C. When James was 9, his parents met with his special education teacher, rehabilitation counselor and other school staff. The discussion revolved around what James would be doing 10 years from now. The parents seemed to think he would be doing the same things he does now but that we would be older. The teachers stated that James seemed to be strong but poorly coordinated and said he would benefit from adaptive physical education where he would work on knowing where his body was in space and large muscle activities. Also, following direction, skills should be addressed. James' communication is good, he likes to be outside, and he has a good attention span, but he does not take care of his clothing or anyone's property.

Discussion involved what James might choose to do after school. Ideas of potential jobs presented to the parents were groundskeeping attendant, carpenter's helper and similar work. It was suggested that he became involved in a community swim program and active in physical education in school, be given daily family chores and be expected to hand or fold his clothes after school. He also should be given a small allowance. School and home will help James become more aware of people doing jobs in his community and help him to better evaluate himself in relation to these and similar jobs.

### Summary of Cases

These cases highlight the potential benefits of an early prevocational evaluation using a team approach. This team approach could result in positive program changes to help students more fully develop educational and vocational potential. The team approach to education, vocational diagnosis, treatment and placement developed because specialists experienced difficulty in working alone with many handicapped students (Fearn, 1971, Vocational Evaluation and Work Adjustment Association, 1975). The team concept offers a broader view and inputs different perspectives to the education and rehabilitation process. Creative interaction of team members will help those professionals playing pivotal or primary roles to perform better in their own job and help them to carry out or facilitate carrying out of tasks important to other professionals working with the same students.

### Students Needs

The need for extra help and support is usually greater with students having disabilities and vocational rehabilitation services can be most helpful with this population in a school setting. The vocational rehabilitation counselor, vocational evaluator, and work adjustment specialist functioning in or with schools systems do work closely and more precisely with older students. They focus on and offer supportive services to older students and they work closely with teachers and other staff who have younger students who may later experiencing difficulty in making the transition from school to work.

### Consulting

In a school setting the vocational evaluator and the vocational rehabilitation counselor function often as consultants to teachers and to other school staff. Several assumptions support this consulting role for the rehabilitation specialist. The most important assumption is that the consultant is fully trained and experienced in the areas where consulting will be provided. Also, teachers and other professional staff in the school setting will already own many special skills, knowledges, and related kinds of information and problem solving abilities related to many jobs and kinds of work. They will know about curriculum development, teaching strategies, situations surrounding students, other teachers, the school and the community. As a result, many highly qualified professionals stand ready to assist the vocational evaluator and the vocational rehabilitation counselor in their part of the rehabilitation process. A minimal amount of training, a little extra time and a few special tools may serve to make these professionals valuable vocational rehabilitation team members as well as special teachers.

A consultant in prevocational evaluation should provide or help others provide the following: 1) define student problems in the light of labor market needs, evaluation tools and training possibilities;

2) Help student to set realistic educational and vocational goals and objectives in relation to the world of work; 3) select appropriate measurement tools for individual students; 4) seek out and reinforce input from fellow team workers; 5) provide vigorous school-related analysis and syntheses of student data and work data; 6) indicate possible or probable vocational outcomes and benefits; 7)identify and describe worthwhile alternative approaches to problem solving 8) provide meaningful cost-benefit analysis where appropriate; and 9) identify barriers to constraints on alternatives to student attainment of work related objectives. Since special education, vocational rehabilitation, and vocational education problems are often very complex, teamwork is a must in this prevocational process. Because of the complex problem and team effort it is very important that consultants be flexible and supportive of other team members. The results can be most gratifying.

## Consultant Preparation and Activities

The vocational evaluator or vocational rehabilitation counselor hired as a consultant can be either in-house with responsibilities toward many students and staff people or the consultant may be hired part time from outside to assist with more complex work-related student problems and to guide or fill in at select spots in the vocational rehabilitation process. In the prevocational school setting, the consultant may play the role of a technical expert who possesses considerable knowledge and expertise that may take a fair amount of time for someone else to learn and additional time to keep new knowledges up-to-date and the skills sharp and available for immediate application. The qualified consultant should also play an increasing role as a facilitator to prevocational problem solving by other school professional staff. In the latter situation there may be frequent calls for expert knowledge and technical expertise but the consultant would spend more time bringing in technical resources and learning aids and in doing in-service training with direct service staff.

The resources and training consultant approach has the advantage of allowing the consultant to serve more clients through other professionals (i.e., teachers, counselors and psychologists) who already possess a number of important vocational rehabilitation skills.

The on-site school people are invaluable to the prevocational process and their expertise and observation must be utilized in vocational assessment. They are already there, they have to be there all day (at least the teachers do) and they are already partially trained. Therefore, they can function well with only a limited amount of specialized training. High quality prevocational evaluation can result in using but a limited amount of extra teacher time and a limited amount of consultant time. This approach can work well and it is a cost effective process.

## Some Administration Issues

Rehabilitation counselors and vocational evaluators in a school setting often find they are providing or can provide overlapping services to other rehabilitation and educational staff and to students with disabilities. This overlap can be a strength as long as professionals in both groups are aware of the overlap and are respectful of each other. This overlap is or can be true for two reasons: (1) Members of both professions will have had strong training and experiences in: utilization of occupational information, working with disabled people who have functional limitation and dealing with disabled people in work experience programs. (2) the organizational structure and administration staff of the prevocational program in the school setting supports the team effort.

Rehabilitation/evaluation professionals may fit into the school organization in a variety of ways depending on the community, the school and local resources. State office of vocational rehabilitation counselors or evaluators may be assigned to the school or territory. Private consultants may be hired as needed or these professionals may be hired as school employees. Whatever the arrangement, the potential benefits for the student are substantial.

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# A HIERARCHICAL MODEL OF VOCATIONAL EVALUATION: FLEXIBILITY MEANS BETTER SERVICE

**VICTORIA ANNE MASON**

**ABSTRACT:** The evolution of vocational evaluation is such that there is a greater need for flexibility. This need is created by the greater variety of people being served; by the creation of profit-based vocational evaluation establishments and the private practicing vocational evaluation specialists; and by the need for more cost-effective service capabilities. This article presents a Hierarchical Model for vocational evaluation as one systematic approach for meeting this need for flexibility.

In the past, the predominant use of work samples by vocational evaluation programs was considered to be an enlightened method for assessing the vocational needs and skills of disabled people. Now, work samples are frequently viewed as cumbersome, of questionable validity, time-consuming and expensive. Additionally, there are many factors which have not only changed the nature and use of work samples themselves, but have also caused subtle changes in the concept of vocational evaluation and have created new approaches or improvements on traditional approaches. These factors include the introduction of the computer, the task-analysis approach for job-structuring, the development of standardized tests normed on populations of mentally retarded individuals, the emphasis on vocational development in special education, availability of vocational rehabilitation to worker's compensation recipients, and the need to improve job placement for JTPA clients.

The results of these influences requires vocational evaluation to reference itself less to one approach and one type of population and more to the ability to match the approach to the individual client. Thus, vocational evaluation will expand away from the "voc eval unit" of the special education program and the rehabilitation facility. During the next ten years there should be a surge of private practicing vocational evaluators and profit-based vocational evaluation establishments, which will serve disabled and non-disabled populations. Additionally, public rehabilitation agencies will require greater flexibility of assessment approaches at different fee structures to promote cost-effectiveness. Most importantly, vocational evaluation programs will be more flexible in the way they may serve their clients.

## Hierarchical Model

The successful application of

vocational evaluation/assessment shall depend on how well the program relates to the needs of the individuals being served. A flexible system for meeting these needs can be created through a vocational assessment/evaluation menu. This menu consists of a hierarchical model of vocational evaluation/assessment "packages." The basis for the hierarchy is the level of comprehensiveness of each program package. Generally, the more comprehensive the evaluation/-assessment, the more time-consuming is the package. Table 1 outlines the Hierarchical Model of Vocational Evaluation.

TABLE 1

SUMMARY DESCRIPTION OF HIERARCHICAL MODEL OF VOCATIONAL EVALUATION

| FEATURE | SPECIALIZED ASSESSMENT | TRANSFERRABLE SKILLS ASSESSMENT | ONE-DAY VOCATIONAL ASSESSMEN | SHORT-TERM VOCATIONAL EVALUATION | LONG-TERM VOCATIONAL EVALUATION |
|---|---|---|---|---|---|
| TIME | Few hours to 2 days, depends on the issue(s) addressed | One to 6 hours, depending on computer capability | Four to Seven Hours | Two to five days | Two to six weeks |
| PURPOSE | To thoroughly and adequately assess one or two specific skills area; behavior not specifically addressed. | To determine occupational alternatives based on past work history, case records, and/or client interview | To obtain a worker profile for the determination of complimentary vocational alternatives | Either to assess skills and behaviors related to a occupation, and/or to observe specific behaviors and work tolerances. | To determine the educational, occupational, and rehabilitation potential with emphasis on behaviors, habits and work tolerances. |
| ASSESSMENT APPROACHES | Choice of testing approach depends on the reason for referral | Case review, interview, and thorough analysis of work history. | Standardized tests, some work samples, interview, and limited behavioral observation. | Interview, standardized tests, work samples, situational assessment, on-the-job evaluation. | Relies heavily on situational assessment and work samples. |
| APPROPRIATE REFERRALS | Individuals for whom the job placement may depend on whether or not the presence of a specific skill can be confirmed. | Individuals who have a significant work history and for whom testing is not appropriate initially. | Client with reading skills at 6th grade minimum, for whom behavior and physical tolerances are either well-defined or not a significant issue. | Individuals with minimal or functional academic skills and minimal need for specialized time-consuming assessment approaches. | Individuals who are severely disabled and for whom either behavioral issues are a main concern and/or special techniques must be used. |

## Specialized Assessment

The purpose of this assessment is to thoroughly study a specific issue or two. This evaluation may be needed to determine the appropriateness of a job placement or the functional extent of a disability. The Specialized Assessment may use standardized tests and/or work samples, depending upon the issue being addressed. The time needed for this assessment could vary from one hour to more than a day; again, it depends on the issue addressed. The Specialized Assessment is appropriate for individuals who may have a disability which imposes specific limitations while not having broader implications to other areas of skills, aptitudes, or interests.

### Example

Jim Smith, who is suffering from Carpal Tunnel Syndrome, may need a thorough evaluation of functional manual and finger dexterity skills, for the purpose of determining the feasibility of placement as a cashier. Dexterity tests and a cashier work sample may be administered.

## Transferable Skills Assessment

The purpose of this assessment is to determine occupational alternative based on information obtained from the work history, case record, and/or client interview; this based on the premise that a person demonstrates certain aptitudes, skills, and interests through a successful work history. Therefore, by adjusting the worker's "profile" to accommodate to the functional limitations imposed by the disability, potential occupational alternatives can be determined. This is the premise of the computerized occupational matching systems and the VDARE process. The amount of time can vary from one hour to six hours, depending on access to computer programs. This type of assessment is often used by rehabilitation counselors to determine the evaluation needs of the client. Additionally, it is frequently applied to legal situations and to the vocational evaluation of industrially injured workers.

**Example**

Jim Smith's rehabilitation counselor or vocational evaluator may have determined the need for the Specialized Assessment by having done a Transferable Skills Assessment.

### One-Day Assessment

The purpose of this assessment is to obtain a "worker profile" of skills, aptitudes, interests, and values, which is the basis for the determination of complementary vocational alternatives. It differs from traditional vocational evaluation by not "utilizing work" and by relying primarily on standardized instruments. It does not comprehensively address work tolerances, behaviors, and habits. This assessment usually requires one day of testing (anywhere from four to seven hours), and it relies primarily on standardized tests, client interview, and review of the case records. Work samples are used minimally and behavioral observations made usually result in limited implications.

Appropriate referrals are those individuals who 1) have a 6th grade or better reading skills, 2) are of borderline to average intelligence or better, 3) have work tolerances well established by other means or disabilities that do not significantly affect physical functioning, and 4) have behaviors or work habits that are not of concern.

**Example**

Mary Jones wants to drop-out of school but has idea what kind of work she can get. Her teacher would like her to enter the vocational education program and wonders which training curriculum would be best for realistically counseling Mary.

### Short-Term Vocational Evaluation

The overall purpose of the Short-Term Vocational Evaluation is to assist the individual and the counselor/teacher with vocational planning. However, emphasis also may be placed on assessing skill, behaviors and work tolerances specific to an occupation or determining a "worker profile," as well as addressing issues of work tolerances, behaviors, and habits. The time needed for this assessment is generally two to five days. All approaches of vocational evaluation may be used, with some emphasis on the use of work samples. Appropriate referrals are usually those individuals with minimal academic skills and a minimal need for the more time-consuming and specialized vocational evaluation approaches, such as situational assessment.

**Example**

John Cabot is interested in becoming a mechanic and has a learning disability. This evaluation would focus on the skills, aptitudes, etc., requirements for mechanics. Stan Davis has first grade reading skills and has chronic osteomyelitis as a result of a leg fracture. His evaluation would focus on the determination of appropriate vocational goal alternatives and his vocationally-related needs to enable the development of a successful rehabilitation plan.

### Long-Term Vocational Evaluation

This assessment is a traditional vocational evaluation, designed to determine the occupational, rehabilitation, or educational potential and needs. Particular emphasis is placed on work tolerances, behaviors and habits, and special needs to be addressed in the rehabilitation or educational plan. This type of assessment is the most comprehensive and allows the client to receive hands-on experience or preliminary training to prepare for assessment with work samples. It makes extensive use of situational assessment, work samples, and other specialized vocational evaluation techniques. Individuals who benefit from this assessment form include those who have severe disabilities that affect several skills areas or for whom behavioral issues are a primary concern.

### Example

Cathy Raines suffered a closed head injury which has affected her language and motor skills as well as her behavior. Her evaluation would focus on the vocational impact of these limitations and more thoroughly assess the functional extent of these limitations.

## Implications for the Future

The evolution of vocational evaluation from a historical perspective indicates that the dependence upon work samples and "traditional" long-term vocational evaluation is not appropriate to all disabled individuals. Moreover, vocational evaluation has applicability not only outside the state-federal vocational rehabilitation program, but also outside the disabled population. Many factures have been influential in this evolution. Additionally, current economic restraints on vocational programs require that vocational evaluation specialists provide cost-effective alternatives that better meet the needs of the people they serve.

The Hierarchical Model of Vocational Evaluation enables the vocational evaluation specialist to more effectively select vocational evaluation approaches and techniques that meet the needs of the client. The vocational evaluation specialist can also offer a cost-effective vocational evaluation service to meet the needs of the referring agency, counselor, or teacher. The Hierarchical Model additionally enables the vocational evaluation specialist to incorporate the new or improved vocational evaluation techniques and approaches into program capabilities. The future evolution of vocational evaluation centers on three areas of concern: 1) The willingness to abandon the philosophy that only time-honored methods of vocational evaluation programs can meet the needs of all disabled people, 2) the access to private-practicing vocational evaluation specialists by both disabled and nondisabled individuals, and 3) The ability to provide greater flexibility in meeting the needs of the client/student. This Hierarchical Model addresses all three areas of concern, of which the need for flexibility may be the greatest.

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# SHORT TERM TRAINING OF VOCATIONAL ASSESSMENT PERSONNEL: KEEPING APACE WITH THE CHANGING PROFESSION

COLLEEN FOX ESSER

**ABSTRACT:** Training is an important professional issue. Because of the growth and diversity of the field, the shrinking of federal support, and an increasing demand the field of training is becoming increasingly complex. This paper looks at some of the most relevant training issues for the field of vocational assessment.

In 1975, the Vocational Evaluation and Work Adjustment Association (VEWAA) published the Vocational Evaluation Project Final Report, the culmination of a three-year study which was sponsored by VEWAA and funded by a grant from RSA. The purpose of the project was to "attain and publish a professional consensus" with respect to a number of areas of concern in the field of work evaluation. The task force involved identified: the unique features, processes, and tools of work evaluation; the skills needed to provide work evaluation services; and the target population that such services could effectively serve. In addition, the study addressed the need for development of standards for work evaluation services, and attempted to define the role of the professional evaluator. The Final Report was a document which described the "state-of-the-art" of vocational evaluation at the point in time and served the field well in terms of defining and clarifying concepts and in raising important issues of our profession.

Now, in 1984, VEWAA has undertaken the sponsorship of another "state-of-the-art" project in the form of the National Forum on Issues in Vocational Assessment." Although the same types of demographic data will not be generated by the conference as was by the 1975 study, it is interesting to note the topics being presented as current issues and to make some comparisons with the issues of 1975.

The first section of the 1975 study took a look at vocational evaluation in the human services delivery system, but dealt almost exclusively with it as a service of the state vocational rehabilitation services system. Much discussion was devoted to definitions, goals, and objectives of vocational evaluation.

Today, 1984, there is still a concern with the development of vocational assessment theories, models, and applications, with the provision of quality services in an effective and efficient manner, and with the need for the continued development of a body of knowledge and research activities to validate our methods. Today our profession has expanded into many new areas of service and vocational evaluators are now found in settings somewhat different then nine years ago. Thus the demand for better research is even more critical than in 1975.

In an attempt to identify a "typical" client, the 1975 study collected data which showed that 64% of the clients served were referred to facilities by the state vocational rehabilitation agency and the primary handicapping conditions of clients served was mental retardation. Although similar data is not available today, it is certain that there is much greater diversity in our clientele. Vocational evaluators are now assessing school-aged populations as well as elderly persons; clients with closed head injuries, chronic mental illness, learning disabilities, chronic mental illness, learning disabilities, chronic pain, and industrial injuries. Follow-up of recent graduates of Stout's Master's program find many still employed in rehabilitation facilities; however, others are now working secondary and post-secondary school settings, correctional institutions, in private-for-profit rehabilitation agencies, insurance companies, hospitals, and private industry.

Finally, the VEWAA study took a look at the role of the vocational evaluator and generated some descriptive data on persons in the field at that time. In 1975, most vocational evaluators were hired with little or no formal training in vocational evaluation. Most were trained either through short term training, in-service training, or by a method referred to as a "learn-while-you-earn OJT." Eighty seven percent of the survey respondents worked in private non-profit rehabilitation settings. Certification of vocational evaluators was suggested as a means of upgrading the profession.

The greater variety of settings in which evaluators are employed today has already been mentioned, but it would appear that many practicing vocational evaluators in rehabilitation facilities are still not formally trained, at least not at the Master's level. The variety of settings and opportunities for graduates of existing pre-service programs has made it difficult to meet the demand in the field.

The VEWAA Study of 1975 was important in identifying issues of an emerging profession. It also documented the need for training of vocational evaluators and helped training programs such as Stout's short-term training program structure the content of their programs. Training is still an important professional issue today. However, given the growth and diversity of the field, the diminishing federal resources, and increased demand for training, it is a more complex issue and needs to be carefully looked at. The remainder of this paper will address some of those training issues for the field of vocational assessment.

## Settings

### School-Based Assessment Programs

Vocational evaluation in schools was minimally addressed in the 1975 VEWAA Project Final Report. However, in one section which summarized comments by leaders of related fields, school personnel expressed somewhat of an interest in the evaluation process and encouraged further development and communication. Interestingly enough, one Office of Education representative suggested that the term vocational evaluation should be replaced by vocational "assessment" or "appraisal." In general, however, evaluation in schools settings was minor area of concern.

Obviously, times have changed. Issues related to assessment in schools are of major concern to the 1984 conference. Legislative mandates as well as changes in philosophy and consumer expectations have caused both secondary and post-secondary educational institutions to identify and provide for "special needs" of their disabled students. The need for better assessment capabilities was recognized by school personnel who found that vocational programming was far more complex when severe disability and societal attitudes toward disabilities were considered (Stewart, 1980).

To date, many states have developed models of vocational assessment for their special needs students, and the federal emphasis during the past four years on "transition-from-school-to-work" suggests that many more states and/or school districts will be studying vocational rehabilitation and vocational evaluation techniques in order to adapt them effectively to their needs. McDaniel in Volume VIII, Number 6, of Rehabilitation Brief, stated that the Commission on Certification of Work Adjustment and Vocational Evaluation Specialists (CCWAVES) estimated that the potential for certified vocational evaluators is eight times higher in school setting than in rehabilitation settings.

The issues for training become quite obvious and, indeed, somewhat overwhelming. As with rehabilitation facilities, some school systems will hire trained, certified evaluators, where many other will rely on in-service and short-term training to upgrade the skills of existing staff.

Noll (1978) found that tasks performed by evaluators in the schools he studies were virtually the same as those performed by evaluators in rehabilitation facilities. However, certain knowledges and skills are critical and need special emphasis in training school-based evaluators.

For example, services in schools are generally designed to facilitate the career development process (Rehabilitation Brief, April, 1983). Assessment programs must be developed along a career development model rather then a medical model as often happens in vocational rehabilitation services. Evaluators must understand the various stages of career development in order to develop appropriate assessment strategies to address needs of specific age groups, for example 7th graders as opposed to 12th graders.

Training programs must also take into account that school-based evaluators work with numerous other parties aside from their students who may not be familiar with vocational assessment techniques. They must be able to explain evaluation results to teachers, both special and vocational education, counselors, administrators, patients, work study coordinators, etc. Evaluators in schools are also part of a multi-disciplinary team who all contribute to the development and implementation of the IEP. Team building, problem-solving and superior communication skills are then required.

Vocational exploration activities are an extremely important part of school-based assessment programs. School evaluators need thorough knowledge of occupational information resources and vocational exploration systems. A knowledge of community resources, and a thorough understanding of occupational requirements and trends.

School-based assessment programs, particularly those located in post--secondary settings, often are used to identify appropriate vocational training program choices or alternatives. Evaluators are asked to assess skills, abilities, and interests in relation to existing vocational training programs. Thus, an understanding of vocational education in general, as well as requirements of specific vocational education programs is a needed competency.

Peterson (1981) suggest that well trained evaluators can promote cost effectiveness in school programs by developing local work samples and using existing school resources rather than purchasing expensive commercial vocational evaluation systems. Training programs may need to place extra emphasis on work sample development and norming procedures.

Trainers of school based evaluators must be aware of the variety of school-based models. McCray (1982) describes six models:

1) Assessment in special education classrooms
2) Assessment in occupational exploration classes
3) Integrated vocational assessment
4) Vocational evaluation center
5) Contracted vocational assessment
6) Mobile evaluation units

Although evaluator competencies are fairly constant across programs, each model presents differing problems and concerns.

In summary, school based assessment programs and the needs of evaluators in those programs offer a variety of training issues to be considered. Certainly, there are others not mentioned here, but in general the literature suggests that such evaluators need to develop competencies in the general areas required by CCWAVES certification. However, they also need an understanding of career development, special education, and vocational education (Peterson, 1981); knowledge of federal legislation as well as local resources and concerns: team work ability; and ability to adapt traditional vocational rehabilitation practices to a school population and settings. Short-term and in-service training programs should be designed accordingly.

## Private Sector

It is not surprising that "private-for-profit" rehabilitation was not mentioned in the 1975 Final Report. The growth of the field of private practice in rehabilitation has been one of the major developments of the 1980's, and where the vocational evaluator fits into this field certainly is one of the more interesting issues to be discussed. The Fall/1983 VEWAA Bulletin devoted an entire issue on private practice of vocational evaluation and in it a number training issues emerged.

In her introductory comments, Ellis (1983) expresses a concern for the lack of preparation for evaluators offered by pre-service training programs. Sink and King (1983) state that there a "few evaluators in the private sector who devote full time to vocational evaluation", and suggest a private sector evaluator needs skills and competencies common to both evaluators and counselors.

Mason (1983) addressed work evaluation from an industrial perspective and suggests that rehabilitation specialists in the setting need training in human resource management, labor relations, prevention and safety management, and general business. Articles by May and Brandon (1983) address the vocational evaluator as an expert vocational witness which raises questions of what skills are needed in the courtroom. The diversity of viewpoints reflects the scope and diversity of issues surrounding private practice rehabilitation.

As a professional involved in short-term training of evaluators for a number of years, I can recall few issues of more controversy than that of the role of federally funded training programs in the training of practitioners for the private sector. Aside from the obvious issues of needed competencies and required modifications of technology and process, the greater question has been where and on whom should we expand our limited training resources. On the one hand, there is still, and will be for some time, a great need for trained evaluators for the traditional rehabilitation facility settings (Menz, 1983). On the other hand, the demand and market is there for training of private practice personnel.

The Research and Training Center at Stout has chosen to focus in its training efforts in this area on evaluators in rehabilitation facilities who are assessing industrially injured workers referred by private practice rehabilitation specialists or insurance companies. These evaluators generally have had experience working with the more traditional facility clientele and evaluation programs and are now dealing with a different population, referral sources, and expectations. Our needs assessment for this program suggested training in the following areas:

- Understanding of private sector rehabilitation/workers compensation
- Adaptation of traditional evaluation tools for industrially injured
- Shorter term evaluation
- Job modification and job restructuring
- Vocational expert testimony
- Marketing evaluation services
- Communication skills
- Working with employers

## Rehabilitation Facilities

Even though it is exciting to see the changes in our profession, it is important to remember that traditional rehabilitation facilities are still the primary employers of vocational evaluators. In his 1983 study of Manpower Needs in Rehabilitation Facilities: 1980-1990, Menz projected that there will be a 97% increase in demand for evaluators in facilities by 1990. Even without the expansion into other settings, the implication of these projections for training resources is challenging to say the least. Newly funded pre-service training at the graduate level will certainly provide for some of the need. However, sheer numbers indicate a continued need for "fundamentals" training for facilities who are unable to hire graduate evaluators. Basic short-term programs must continue to be offered to train evaluators in the vocational evaluation process, tools, and techniques. Such training continues to be a high priority for Stout RTC. However, as the field matures and expands, we have found that training needs for experienced vocational evaluators must also be addressed. The following sections will address some perspectives on those needs.

## Issues of New Client Populations

Just as the setting for vocational evaluation services has changed since 1975, so has the client populations with which we deal. Participants in all of our short-term training programs are asked to complete a "problem identification" for indicating specific client or program problems they wish to discuss in the training program. These forms along with requests from the field for specialized training constitute an informal, continuous needs assessment for our programs. A number of issues and trends have emerged from these requests. A client population which appears to be of concern to our participants at present are those with traumatic head injuries. Dealing with the complexities of assessing such a population is certainly an important issue for short-term training programs.

In an excellent and informative article in the Spring, 1983, VEWAA Bulletin, "Issues Relevant to the Vocational Evaluation of the Traumatically Head Injured Client," Musante suggests that the primary problems of assessing this population are:

1) Difficulty in estimating function given inconsistencies in performance
2) The expression of anger as a natural reaction to the evaluation process
3) Inherent problems in using standardized tests and work samples
4) The need for non-static evaluations over a longer period of time.

Musante suggest that it is more important for evaluators to assess ability to compensate for deficits than to make specific employment recommendations and stresses that a "team approach" is essential as well as creativity and problem-solving. Evaluators working with this population have been able to find relevant training in the medical aspects of this disability, but not as often in vocational aspects, especially effective assessment techniques. Addressing these needs will require a "pooling" of knowledge between those with medical expertise and those with vocational skills and knowledge, as well as an identification of practitioners who on a day-to-day basis are discovering suitable methods and technology.

Another client population which is of special concern to our participants are those persons with chronic mental illness. As with many severely disabled persons, experienced evaluators suggest a multiplicity of techniques and a team approach. Beley and Felker (1981) developed a program which required close cooperation between psychologist and evaluator and a combination of assessment tools, in a three week evaluation to answer referral questions. Issues identified by the authors include the need to observe behavior over a period of time due to the variability of the effect of chronic mental illness on behavior, dealing with societal fears; and the effects of secondary manifestations of the disability such as passive dependent behavior learned in an institution.

Cubelli (1970) feels that it is the attitude of rehabilitation workers which becomes critical. "The tendency of mental patients to regress, recompensate, and regress again" can be extremely disconcerting to the evaluator. Evaluators who have been trained to assess objective data, Cubelli states, must also be ready to evaluate more subjective forces which he terms "readiness to work." In other words, assessment of motivation and ability to function independently and relate to others takes precedence over assessment of work skills.

Evaluators who work with these disability groups as well those who work with individuals who are learning disabled or severely developmentally disabled require training focused not only on assessment techniques, but on the use and modification of those techniques to effectively serve their clients. In some cases, we have included units to address these concerns as part of our regular programs. Others, such as assessment of closed head injury clients will require a free-standing program to deal effectively with the complex issues.

In any assessment program which deals with clients who are severely handicapped, training programs need to emphasize teamwork. Interestingly enough, the 1975 report devoted a whole section to "the Evaluator Team Approach" stressing the evaluator's need for skills in communications, group dynamics and group decision-making. Again and again in the review of literature for this paper, the concept of teamwork was emphasized for effective assessment and rehabilitation programming of severely disabled clients.

### Issues of Professionalism

Much has been written since 1975 regarding the "professionalism" of vocational evaluators particularly over the issue of certification. Amid discussion regarding the presence of a systematic body of knowledge, professional authority and culture, and ethical codes, the certification process was established and is now a reality. At present more than 580 person are certified as vocational evaluators as the grandfathering period comes to a close. Now in 1984, the question is no longer whether or not we are a profession, but how to enhance that professionalism. Training can be involved in that enhancement in a number of ways.

Of course, the obvious is that training (hopefully) upgrades skills of practitioner and thereby improves the services provided to handicapped individuals, a primary professional concern. As certified evaluators need certification maintenance, it will be important that training resources are ready to provide quality training which meets CCWAVES maintenance requirements as well as professional evaluator needs.

In 1981, the Stout Research and Training Center training programs, recognizing the need for advanced training, surveyed past participants to determine advanced training needs. Topics suggested were consistent with those being dealt with in the 1984 Issues Forum. Some of these were: validity, reliability and norming of work samples; use of vocational evaluation tools with severely disabled; assessment of learning styles; rehabilitation technology; program evaluation; private sector rehabilitation; and communications skills. Although many topics were initially offered in a single program, it was determined that most topics needed to be offered in more depth in separate, free-standing seminars. One of these "advanced" programs is the "Assessment and Placement of Industrially Injured" program previously mentioned.

All of these considerations point up the critical need for training at an advanced level for professional evaluators. As the field grows and changes, issues such as those discussed in this paper and at this conference need to be addressed through high level, advanced training seminars utilizing experienced professionals who are actively involved in the profession. As the field becomes more complex and sophisticated, training personnel must work more and more to identify experts in our field who are willing and able to share their expertise with their colleagues. To this end, the Stout RTC has developed a roster of adjunct faculty who are either field practitioners or faculty from other academic settings. These adjunct persons are utilized according to their expertise, availability, and seminar location and have helped immensely in the development of our advanced training programs, as well as to supplement our staff for fundamentals programs.

Another issue of professionalism is in the area of research. At present thirty Research and Training Centers are funded by NIHR, four with a vocational emphasis. Leaders in the rehabilitation field have recognized the need to carry out research and to disseminate results to the practitioners. However, results of research take a long time to reach practitioners and it is often in a form unintelligible to the everyday practitioner (and sometime to the everyday trainer!). Baker (1980) pointed out that "professions are developed over time by the shared knowledge of people engaged in a common area of interest and inquiry" and that "the application of knowledge (facts gained via the scientific process) is practiced more by professionals than technicians/craftsman." Baker identified a concern that is at the core of the issue of professionalism, and he went on to suggest that perhaps it is time to "expand our professional side through the development of theory related to the vocational development and adjustment of disabled persons."

Training personnel have a responsibility to reinforce this goal for our profession by including in our training programs relevant and timely research, by assisting to identify research issues through contact with practitioners, and by encouraging applied research by practitioners.

In conclusion, I have attempted to identify and discuss some of the issues in training of vocational assessment personnel. Certainly there are many more issues which could be discussed in all of the areas mentioned. The areas with which I have dealt reflect concerns expressed to the training staff of the Stout Research and Training Center by our program participants, by our National Advisory Council, and by other professional colleagues. The growth and development of our profession provides training personnel with complex challenges and opportunities. It is important for us not only to be aware of the issues and changes in our field, but to communicate closely with other training programs to meet those challenges most effectively. I appreciate the opportunity to be involved in the National Forum on Issues in Vocational Assessment and hope that this paper will facilitate dialogue with others who are concerned with training issues in vocational assessment.

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# THE CAREER ASSESSMENT PROCESS IN THE INTERMEDIATE DISTRICT; A SERVICE TO A DIVERSIFIED AGE AND ABILITY LEVEL CLIENTELE

**GERALD J. MURRAY**
**TIMOTHY L. SKAJA**

**ABSTRACT:** This paper describes the implementation of comprehensive career services in Minnesota Intermediate District #287. These services provide a wide range of specialized services to a diverse audience.

With the development of the Joint Intermediate District in 1967, the intermediate district concept became a reality in that it was an extension of service to the local community, local schools, business and industry and the Twin Cities of Minneapolis and St. Paul community at large.

The Career Assessment Service was developed and has grown in direct response to the growing and continually changing demands of that community and the state. It is a career assessment approach incorporating many of the concepts of the intermediate district. The magnitude, the mission and the multitude of services provided as a district affords unlimited opportunities for a dynamic model of Career Assessment Services. Discussion of the specific components of the intermediate and the uniqueness of the services delivery options of career assessment are discussed. The Career Assessment Service (C.A.S.) demonstrates innovative linkages, in-kind contributions and a cascade of services career assessment and planning model unique in its scope and networking capabilities.

Career planning and assessment professionals frequently experience resistance and/or frustration in attempting to develop and implement new programs or to improve existing programs and services. (Sankovsky, 1969). Unfortunately, individuals from the various professional disciplines who are involved in career services often have little opportunity for the development of interdisciplinary goals and service linkage to provide a comprehensive career service model.

Within the State of Minnesota many public policies have been instituted to facilitate educational program development. Minnesota has a comprehensive plan for vocational-technical education which includes Secondary, Post Secondary and Adult Vocational Education (1963, 1976). Extensive planning and coordination (HECC, 1984 High Education Coordinating Commission of State educational facilities has been undertaken in the continuing effort to adequately address the occupational preparation needs of Minnesota citizens.

Hennepin Technical Centers (H.T.C.), Intermediate District #287 is a unique service delivery unit which is comprised of 13 member school districts. It was legislatively created and sanctioned in 1965, when in November of that year Independent School Districts No. 271 (Bloomington), No. 273 (Edina), No. 274 (Hopkins), No. 280 (Richfield), and No. 283 (St. Louis Park), suburban Hennepin County districts in Minnesota, entered into an agreement to form the Suburban Schools Services Joint Board, under Minnesota Statutes, Section 471.59 which provides for the Joint Exercise of Powers (1965). In January 1967, Independent School District No. 281 (Robbinsdale) became a sixth member of the Joint Board. The primary function of the Joint Board was to serve as a cooperative interdistrict agency for planning Federal programs.

The need for vocational education facilities in suburban Hennepin County became a concern of the Joint Board.

This concern was brought before the 1967 Session of the Minnesota Legislature. Special Legislation, Minnesota Statutes, Chapter 822, was passed enabling 15 of the Independent School Districts in suburban Hennepin County to enter into an agreement which would establish a cooperative organizational structure for vocational education (1967).

In the Fall of 1967, nine other independent school districts of suburban Hennepin County joined with the members of the Suburban Schools Services Joint Board to form a temporary Joint Planning Board for Vocational-Technical Education. The additional nine districts included Independent School Districts No. 272 (Eden Prairie), No. 275 (Golden Valley), No. 276 (Minnetonka), No. 277 (Mound), No. 278 (Orono), No. 279 (Osseo), No. 282 (St. Anthony Village, No. 284 (Wayzata), and No. 286 (Brooklyn Center).

On October 10, 1968, the participating member districts held their organizational meeting. Formal bylaws were adopted in December, 1968, and were revised to enlarge the size of the Executive Committee in July, 1971. Bylaws provided for the appointment of two representatives from each participating district appointed by the local district board. The full Board of 26 was empowered through a Nominating Committee to elect an Executive Committee of 13 members.

The need for coordination and development of certain special education activities and driver education in suburban Hennepin County became a concern of the Joint Board during the Fall of 1968. This concern was brought before the 1969 Session of the Minnesota Legislature. An additional piece of special legislation, Chapter 945 under Minnesota Statutes, Section 471.59 was passed in June, 1969, which amended the 1967 law to enable member districts to participate in special education and driver education activities (1969).

The mission of this Intermediate district was to provide vocational--technical education to Secondary, Post-Secondary, and Adult students as well as Special Education Services to low-incidence handicapped students. The organization of Intermediate District #287 and a complex network of Social Services in which the District operates, enables it to be an optimal host for a wide diversity of collaborative efforts.

The Districts covers over 500 square miles in suburban Hennepin County with a population of 600,000 people. It serves students referred from throughout the Midwest and its location (just west of the Twin Cities of Minneapolis-St. Paul Metropolitan area) affords unique opportunities for linkages with business and industry. (Carter, 1984).

The District's 1983-84 revenue of $35,730,423 came from:

1. Local property tax levies.
2. Other local and county revenues.
3. State sources.
4. Federal sources.
5. Sales and conversions of assets.

Its 1983 schedule of assessed valuation (20% of market value was $4,654,833,048. (Carter).

In a most cost effective manner Intermediate District #287 provided in Fiscal Year 1983-84 services within the following divisions.

1. Special Education - 1,297 students, 43,070 hours of instruction/services.
2. C.E.C. (Continuing Education Centers) providing education health and welfare needs for pregnant teenagers. Served 78 students, 1983-84.
3. Secondary Vocational Programs which compliment and supplement member districts. 1,584 students from the 11th and 12th grade (10th an waiver) from 13 member districts were served during 1983-84 at three sits in 30 programs.
4. Post-Secondary vocational programs provide 64 career choices with full or part-time training serving 5,620 students (1983-84) at four sites.

5. 47,639 adults were provided educational services.
6. Job Training Partnership Act (JTPA) served 1,446 individuals during the 1983-84 year.
7. 70,001 is a nationally organized program for high school dropouts between the ages of 16 and 21 who live in suburban Hennepin County. 235 individuals were served during the 1983-84 year.
8. Career Assessment Services (C.A.S.) - 522 students/clients were served during the 1983-84 year.

Given the scope and diversity of services offered in the Intermediate District, (the population base, the funding resources and divisions), the comprehensive career assessment services were to become a reality. The need for career assessment services within this unique intermediate district concept had been expressed from a number of areas both within and outside the Intermediate service area boundaries.

During the late Seventies member school districts, due to decreased pupil service budgets and increased work loads, were unable to provide career education and assessment services at the needed level. Many services were provided by contracting with outside vendors. As described above, within the joint Independent District #287 were a range of service options which, if pulled together, could meet the varying and changing needs of the service audience. In addition, the Intermediate District recognized the specialized needs of the large number of handicapped citizens living in suburban Hennepin County and implemented support options according to the Rules and Regulations of 92-142 (DRF, TITLE 45, PART 121.3a) especially in response to the wording . . .

> "to assure that every handicapped child who leaves school has had career educational training that is relevant to the job market . . ."

Based on this need the JISD #287 Board approved the development of a career assessment service model, to be implemented on a pilot basis during the 1981-82 school year. (May 7, 1981 - Vocational Assessment Proposal presented to the Board). The proposal was the result of an in-house study which had been previously completed and as a response to numerous requests for vocational assessment, within the Intermediate district. At this point a coordinator was assigned and individual staff members from all divisions were appointed to complete a needs assessment and to outline the scope of services required within the District. This group established criteria which was deemed essential to the success of a career assessment service. These components included:

1. Strong support from JISD #287 Board and the local administration for the program.
2. A linkage and in-kind sharing between all Intermediate District Divisions (Secondary, Post-Secondary, Adult, Special Education, JTPA).
3. Positive attitude and support from all Intermediate District staff toward the needs of all individual students/clients.
4. Strong, comprehensive student support services.
5. Commitment to the philosophy emphasizing supportive education services to students needing specialized instructional assistance to succeed in training. (Examples of this would include providing interpreters in the classroom for the hearing impaired, mobility aides in assisting the physically impaired, physical therapists, etc.)
6. Direct access to all existing resources available throughout the District.
7. That the service will not function as a funnel and screen for HTC programs but

will meet individual career needs.

With this criteria in mind, a review of the literature and contacts with existing facilities were completed to determine the level and kind of services which existed within the community. Upon completing this review, it was determine that the Intermediate District #287 Career Assessment Service model must include the assessment of interest, aptitudes, work skills, work tolerances and work habits through the use of work, real or simulated, as the focal point of the assessment. (May, 1972). Additionally, it was felt that the goal of an assessment service should be to assist the student/client to become more productive until he or she is able to adequately function in an "achievement-demanding" setting. (Gellman, Stern and Soloff, 1963). With these theories functioning as a cornerstone, the Career Assessment service staff began the work of implementing services within the District. The traditional vocational evaluation models (Pruitt, 1977), and (Tenth Institute, 1972) were utilized as a guide in establishing services. This model included:

1. Referral (to include case history consultation).
2. Intake and Initial Interview to determine the appropriateness of referral and level of service required.
3. Vocational Evaluation which included psychometric, and work sample testing, behavioral observations, review of work/educational history and other specialized testing.
4. Occupational try-out, being an actual "hands-on" lab experience, within a determined training program or work experience site - (the primary objective of the try-out being to provide the client with further exposure to a specific program as well as obtaining additional information as the the clients' skills, abilities and behaviors, related to the specific training area).
5. Staffing/Report - career assessment results are conveyed to the referral source through a combined means of a staffing and the comprehensive final written report.

A coordinator was assigned from the Vocational Division to develop, organize and guide the pilot program, under the direction of the Intermediate District's division directors and local school district administrators. It was this steering committee that developed a budget with reflected the service audience needs that first year (secondary aged handicapped) and reimbursement was at 65% from State Secondary Special Needs dollars. A demonstration grant was written to gain additional revenue to hire a vocational evaluator and a secretary.

Also, in-kind contributions of staff and other resources were given by many of the Intermediate Divisions. After much research, material development, and lab set-up, the first student was accepted for service and began the career assessment process in January of 1982. From January through June of 1982, 72 secondary aged handicapped students were provided a comprehensive career assessment experience. During 1982-83 additional resources and staff were mobilized as the joint board authorized the pilot project to continue under fully approved program status. Three-hundred fifty clients were served during 1982-83. As the new program grew in size so too did the scope of audiences served.

During the 1983-84 school year over 500 persons ranging in age from 14 to 66 experienced career assessment. In addition, "Career screening" was provided to 152 individuals, on an outreach basis. Career Screening is a short term, informational gathering process to assist an individual in developing a career path. To accomplish this variety of psychometric tests are administered including, but not limited to the following: (1) Interest Testing, (2) Achievement Testing, (3) Aptitude Testing and (4) Work Value Testing. Identification of career interest areas, aptitudes and work temperaments, aids in career counseling and provides an individual with a focal point for career exploration. The referral base had also been opened up to include all levels of students and clientele within and outside the district, including private for profit rehabilitation agencies. A comprehensive fee schedule was developed during 1983-84 to entertain any type of referral, and those dollars were credited to an assessment service enterprise account.

One recent innovative expansion was the Career Life Planning option which was provided to laid-off teachers from local school districts. These teachers were offered vocational testing and assistance in developing a career plan. This was accomplished through a combined effort of several divisions within the Intermediate District (Career Assessment Service, Post-Secondary, HTC-JTPA and the Administrative offices).

This option was initiated and developed in a joint fashion by local district union officials, personnel specialists and the Career Assessment Service staff.

The current C.A.S. service delivery system has evaluation labs at two vocational technical sites and uses many other district and member district facilities in outreach. The core evaluation labs on the two campuses occupy approximately 7,000 square feet of space and provide a diversity of career assessment tools both commercially and locally developed (MESA, SINGER, Project Discovery, Job Search, Choice, Vocationology, etc.). The 1984-85 Operational Budget is approximately $400,000. The program is staffed by a Coordinator/Psychologist, five M.S. level vocational evaluators, four licensed vocational evaluation technicians, numerous in-kind specialists (Technical tutors, interpreters, OT's PT's, LEP, etc.) and secretarial staff. Additional staff positions and consultative dollars have been budgeted for continued expansion of service. Plans have been developed with Division of Vocational Rehabilitation and private placement specialists to provide on-going in-service to the C.A.S. staff regarding labor market analysis and trends. At this point, the Career Assessment Service has grown in a positive, controlled direction. The uniqueness and variety of services offered within the Intermediate District has been described as a host for development and fostering of an innovative career assessment model.

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# OHIO SCHOOL BASED WORK EVALUATOR TEACHER CERTIFICATION PROGRAM

**ERV NAPIER**

**ABSTRACT:** In Ohio, a program has been designed to facilitate access to public school vocational education as a viable placement for special students through which meaningful and appropriate preparation for the world of work can be found. This program is the Vocational Work Evaluation Teacher Education program. The purpose of this program is to provide needed and relative information to aid school personnel, parents, and students in making informed occupational choices for special students.

School based work evaluation is seen as appropriate and relevant for service to school aged handicapped and disadvantaged students as their needs relate to vocational education. Traditional evaluation programs are concerned by individuals or agencies not fully knowledgeable of the locally available vocational education programs. These traditional programs may not always be available to serve the large numbers of special students for whom vocational education is a definite resource.

There is a need, then to provide work evaluation that is localized to the prevailing conditions within vocational education programs; localized such that school aged handicapped and disadvantaged students may have access to the vocational education programs appropriate to their needs, interests, and abilities. Only evaluators who are thoroughly knowledgeable of the evaluation process, the nature and needs of special student populations, and local vocational program indiosyncrasies can access these programs. The Ohio model for vocational work evaluation teacher education makes it possible for work evaluators at the local school level to function effectively, insuring this needed access.

Persons entering the program must have a bachelor's degree in one of five areas - psychology, special education, counseling, rehabilitation, or evaluation. Each degree experience provides different strengths relative to testing and measurement, education, special populations, or evaluation. The program capitalizes on these strengths and supplements any shortcomings.

All employed evaluators are required to have expertise with the work sample equipment used in the evaluation process. This expertise may be obtained by pre-service training with equipment manufacturer's coursework at a college or university, or through onsite in-services provided by qualified work evaluators. The new evaluator must have twelve months of work experience not connected with education. All the above prerequisites must be verified by the Special Needs Service, Division of Vocational Education, Ohio Department of Education. Instruction that provides a thorough working knowledge of local vocational programing is provided to the new evaluator regardless of their backgrounds.

Qualified new evaluations are employed by a local school district and given temporary one-year vocational education certificates renewable upon successful completion of one year of the teacher education program. This certificate provides the educational legitimacy necessary in public school systems. With successful completion of a second year of the program the evaluator may apply for an advanced certificate as a Vocational Work Evaluator.

The certification program is structured in three phases. The first is pre-service phase followed by two years of in-service. The pre-service phase purposes are:

1. to give the newly employed evaluator an over-all view of the work evaluation process and it's role in vocational education.
2. to acquaint the newly employed evaluator with vocational education and the Vocational Education Special Needs Service.
3. to acquaint the newly employed evaluator with handicapped and/or disadvantaged students.

The pre-service phase is conducted as a one-week seminar in which various specialists make presentations relative to evaluation in the school setting. State department officials, university faculty, and practicing school evaluators comprise the group of specialists.

The first in-service year concentrates on developing and improving the quality of localized evaluational activities to meet local needs. To meet this goal the evaluator completes fourteen objectives designed to establish or verify the existence of certain program quality measures. (These goals are included at the end of this paper). The focus of these goals is the efficient and effective operation of the evaluation program. Consideration is given to the development and use of advisory committees, the capacity of the evaluation program to assess the characteristics and abilities necessary for entry into and predicted success in local vocational programs, compliance with State and Federal guidelines, quality of evaluations, and the understanding of professional vocational and vocationally related organizations and associations. Activities are conducted on site by the Special Needs Teacher Educator from Kent State University. Approximately eight visitations are conducted in the first year of the program.

The second in-service year and third phase of the teacher education program, the evaluator provides the documentation of planned functions and operations of the evaluation center in the same manner that a curriculum documents classroom instruction. The evaluator develops a formal document similar in purpose to a course of study. Significant parts of this document are:

1. introductory statement
2. program and school philosophies
3. program objectives
4. program overview
5. evaluation practices
6. evaluation activities
7. glossary of specific terms

During, the second year the evaluator is also concerned with the content of a course titled "Survey of Vocational Education." This course deals with the history, philosophy, and operation of vocational education at the national state levels. The course is intended to develop and refine the evaluator's knowledge and understanding of vocational education. A required term paper documents the evaluator's comprehension of the intricacies of vocational education. Second year activities are conducted by monthly visits from the Special Needs Teacher Educator from Kent State University.

A large amount of work is obviously required of the evaluator during this pre and in-service program. The Ohio Department of Education, therefore, requires the participating evaluator in the professional improvement program to enroll for nine semester hours of undergraduate or graduate credit at Kent State University, the cooperating delivery agency for the program.

Special resources are frequently necessary if special students are to be successful in schooling experience. For many special students, vocational education is not only a viable alternative to the regular classroom but extremely important to providing the preparation necessary for life after school in the world of work. Before vocational education can fulfill any of its promises or obligations to special students, competent and knowledgeable work evaluators must be available to provide the necessary data for relevant for appropriate vocational choices. In this sense work evaluators working in the local school setting serve as very special resources to special students in Ohio - a resource made functional by the school based certification program for work evaluators.

## OBJECTIVES
## 1st - YEAR WORK EVALUATION TEACHER EDUCATION

1. Develop, refine, and promote the Work Evaluation program through the use of an Advisory Committee.

2. Assess the capacity of the Work Evaluation program to recommend placements in all vocational education programs within the school system.

3. If, after objective #2 is completed, a need is indicated, develop work samples as necessary to enable assessments appropriate to vocational education programs within the school system.

4. If, after objective #2 is completed, a need is indicated, develop purchase recommendations as necessary to enable assessments appropriate to vocational education programs within the school system.

5. If, after objective #2 is completed, a need is indicated, develop situational assessments as necessary to permit vocational class tryouts for Special Needs students.

6. Assess the capacity of the work evaluation program to adequately serve Special Needs students by:
   a. determining an documenting the degree to which students have been successful in recommended placements.
   b. determining the degree to which vocational and special education and guidance and counseling staff members agree that the Work Evaluation program is adequately equipped and staffed to serve Special Needs students.
   c. determining the degree to which vocational education teachers agree that Special Needs students are adequately served by the Work Evaluation program.

7. Ascertain that the work evaluation program provides adequate data and in an appropriate format for use in serving Special Needs students at staffings and in necommended placements.

8. Develop a document describing the roles of Work Evaluation in reference to the roles of vocational education.

9. Develop and implement an in-service program to inform the elementary and secondary, special education, and vocational education faculties of the roles of the Work Evaluation

program in the education process for Special Needs students.

10. Develop and implement a program to better inform the general public about the purposes and operation of the Work Evaluation program.

11. Develop a list of available community resources that can provide appropriate services for Special Needs students beyond those provided by vocational education within the local school system.

12. Develop and maintain a work Evaluation program record keeping system sufficient to:
    a. meet Vocational Special Needs Service supervision guidelines.
    b. permit assistance to vocational teachers, guidance and counseling personnel, special education personnel, and school system administrators.
    c. enable program follow-up studies.
    d. permit periodic reports of Work Evaluation program activities.

13. Prepare and disseminate periodic reports of Work Evaluation program activities to all interested school personnel.

14. Demonstrate an understanding of professional education associations involved with vocational education and vocational special needs.

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# A COMPREHENSIVE EMPLOYABILITY ASSESSMENT STRATEGY FOR DISABLED PERSONS

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**ABSTRACT:** Employability refers to the personal attributes or functional vocational capabilities (FVC's) that the individual possesses. Related to performance in the work place, these FVC's can be enhanced through the proper types of rehabilitation services. However, it is difficult to select these services unless a comprehensive employability assessment of the individual has been conducted. This paper discusses the elements and emphases of such an assessment in terms of a Diagnostic Employability Profile (DEP) currently being developed at the Arkansas Research and Training Center on Vocational Rehabilitation.

A recent VEWAA monograph (Roessler & Bolton, 1983) addressed the distinction between employment and employability. Employment represents the outcome or end goal or rehabilitation services. The probability of achieving a successful outcome with an individual is largely the function of four classes of variables: (a) work-related aptitudes, skills, values, and attitudes of the person, (b) quality of rehabilitation services, (c) level of support from significant others, and (d) labor market conditions.

The Diagnostic Employability Profile addresses two categories of variables:

1. Stable characteristics such as abilities, interests, and personality traits that are important considerations in job/person matching.
2. Modifiable skills germane to employability, i.e., the critical behaviors needed to seek and maintain work.

Assessment of the individual's status on these two classes of variables results in an employability profile which has implications for program planning, vocational counseling, and work adjustment training.

Our model for employability assessment is derived from three existing theories that evolved from research and services in vocational rehabilitation: (a) the Minnesota Theory of Work Adjustment (MTWA) provides an excellent psychometric framework, (b) the Chicago JVS theory of work adjustment is based on clinical insights into individual functioning, and (c) Hershenson's model provides a necessary developmental perspective.

Assessment and intervention strategies discussed in this paper are especially appropriate for severely disabled individuals who are receiving services from rehabilitation facilities and workshops. These individuals should have completed most medical evaluation and restoration services so that they have reached a reasonably stable level of physical functioning. They would then be ready for comprehensive employability assessment and intervention in order to prepare them for successful employment. Use of these assessment techniques is not, however, limited to facilities; they are equally appropriate for efficient diagnostic work in field settings. Such developmental research is planned as part of our Center's five year research plan.

## Propositions

Comprehensive employability assessment deals with those functional vocational capabilities (FVC's) related to success in selecting, obtaining, and maintaining jobs. It presumes adequate collection and accurate interpretation of social history and medical data. Other propositions equally essential to our employability assessment program are:

1. Disabled persons are underrepresented in the work force.
2. Persons seeking services from the public VR program need multiple employability services if they are to secure more than temporary, secondary labor market jobs.
3. Vocational success is a function of the match of person (abilities and values) to job (demands and reinforcers).
4. Employment must be viewed as developmental, i.e., as leading to a career, rather than as static, i.e., as completed once an entry level job is secured.
5. Career encompasses four stages--exploration, establishment, maintenance, and retirement; the first three stages are particularly important in vocational rehabilitation.
6. To fulfill the task demands of exploration, establishment, and maintenance, rehabilitation clients must (a) understand how their abilities, aptitudes, interests, and personality predispositions affect their vocational functioning and (b) develop the specific skills essential for job selection, acquisition, and maintenance.
7. Employability assessment, therefore, must encompass stable characteristics such as intelligence, aptitudes, and interests, and modifiable characteristics such as job seeking and maintaining skills.
8. Enhancing vocational success involves multiple services, e.g., (a) diagnosis of functional vocational capabilities, (b) interventions to enhance selfunderstanding and skill levels, and (c) environmental modifications through job analysis, modification, and restructuring.
9. An employability counseling model should be developed for individuals with disabilities that meets the following criteria: (a) the role of the client as co-manager should be respected and (b) the basic counseling orientation should be facilitative and nondeterministic.
10. Implementation of the model requires both a Diagnostic Employability Profile and Employability-enhancing Interventions.

## Diagnostic Employability Profile (DEP)

To identify dimensions to include in a Diagnostic Employability Profile, we reviewed 15 measures frequently used in vocational evaluation settings. In a figure entitled "Functional vocational capabilities comprising general employability" (Roessler & Bolton, 1983, p. 7), we presented the results of this review. Section II in that figure (Roessler & Bolton, 1983, p. 7) can further be elaborated to specify variables comprising the work personality as defined by Walter Neff. Variables in Section II are directly related to the manner in which individuals cope with the demands of work. Lacking these fundamental skills, some individual receiving vocational rehabilitation services are unable to find and maintain a job so that the other elements of the match principle can operate, i.e., the balance between higher order worker needs and work reinforcers, and between worker competencies and work demands.

The purpose of employability assessment, therefore, is to identify not only the skill deficits related to selecting, finding, and maintaining a job but also the abilities and preferences relevant to matching person and job optimally. This task includes the following considerations: (a) constructs to measure, (b) assessment instruments to select, (c) types of interventions to develop, and (d) outcomes desired from the interventions. Figure 1 presents one perspective on these concerns as they relate to the Diagnostic Employability Profile. Each column addresses two broad categories, stable characteristics and modifiable skills.

**Stable Characteristics**

In addition to intelligence and achievement measures, instruments assessing selected stable characteristics include the GATB/NATB, USES Interest Inventory, and the 16 PF-E. The GATB and NATB, are reading and nonreading versions of a well-known aptitude battery developed by the U.S. Employment Services. Nine specific aptitudes are measured ranging from estimates of general intelligence to manual dexterity. GATB/NATB results relate to a series of Occupational Aptitude Patterns (OAP's) that suggest a wide variety of vocational alternatives for which the person possesses the requisite aptitudes.

GATB results can be combined with data from another measure, the USES Interest Inventory, to determine which of the OAP's are consistent with the person's vocational interests. Cross referencing aptitudes and vocational interests enables the evaluator to develop an even more precise list of job possibilities. Although a significant step, interrelating aptitudes and interests does not provide all of the vocational counseling information needed regarding stable employability characteristics. A measure of personality-related predispositions and preference is, therefore, included in the DEP.

The 16PF-E is a standard measure of normal personality function assessing primary and secondary personality factors Results are useful in vocational counseling because they indicate (a) problems that might inhibit the person's performance such as high social anxiety or low self-esteem and (b) personal preferences or styles that would interact significantly with different types of job demands. Greater self-awareness of these performance inhibitors and personal style preferences would enable the individual to make more realistic job choices.

**Modifiable Skills**

In the area of modifiable skills, the first construct of interest is employability maturity. The work of Donald Super and John Crites provides many insights regarding the nature of employability maturity. As we use it, this concept includes three components: (a) knowledge of self, the world of work, and preferred occupational roles and careers, (b) realism in occupational preferences, decisions, and choices, and (c) problem--solving and decision-making skills. To minimize the effects of literacy, employability maturity is assessed via a structured interview. Specific questions deal with the knowledge, realism, and problem-solving attributes of the person as they relate to the tasks involved in selection and acquisition of work. Results of the interview are intervention oriented, i.e., findings from the interview indicate counseling or training that the person needs to improve his/her job readiness.

To assess another important area of modifiable skills, the simulated job interview samples an individual's behaviors in terms of starting the interview; explaining experiences, skills, and work history; discussing disability, salary, fringe benefits, and advancement; and closing the interview. a detailed behavioral checklist has been developed to score the individual's performance and, more importantly, to identify deficits for interview training.

A composite job application has also been developed for the individual to complete. Performance on the job application is evaluated in terms of neatness, correct grammar and spelling, completeness, and total time required to complete the form. Application and job interviewing skills are important for obtaining a job; maintaining employments, however, another important area to evaluate.

Two approaches to the evaluation of job maintenance behavior are included in the DEP; a series of simulated work situations (Work Performance Assessment/WPA) and a behavioral rating scale requiring observation of actual work performance (Work Personality Profile/WPP). By administering the WPA, the vocational evaluator can determine how individuals typically respond to the interpersonal and task--related demands of work. Gathered through simulated situations dealing with task performance, teamwork, socializing on the job, and dealing with supervisors, results provide a profile of the individual's employment potential in terms of specific behavioral strengths and weaknesses. This profile can be used in identifying significant job/person match considerations and/or in developing behavioral work adjustment interventions.

Based on the early work of William Gellman, the work Personality Profile (WPP) is a comprehensive observer-rating instrument designed for use in vocational adjustment settings. The WPP enables rehabilitation professionals to identify deficits in 58 specific work behaviors that are organized into the following eleven categories of work performance: acceptance of work role, ability to profit from instruction or correction, work persistence, work tolerance, amount of supervision required, extent trainee seeks assistance from supervisor, degree of comfort or anxiety with supervisor, appropriateness of personal relations with supervisors, teamwork, ability to socialize with co-workers, and social communication skills. WPP data can serve as a basis for (a) the development and assignment of clients to remedial programming, and (b) the measurement of improvement in targeted work behaviors by completing the WPP at regular intervals.

## Reporting DEP Results

Results from the instruments listed in Figure 1 and from a thorough analysis of social history and medical data (Roessler & Rubin, 1980) combine to form a profile of the individual's employability strengths and deficits. Reporting these findings in a meaningful way is, however, no simple undertaking. In this section, we discuss tentative guidelines for reporting the Diagnostic Employability Profile (DEP).

The professional responsibility for interpreting the DEP lies with vocational evaluators; they have the expertise to identify a wide range of potentially feasible vocational objectives for the client. To the degree possible, these vocational recommendations should be made in terms of a career rather than a single entry level position, i.e., potential vocational goals should be presented in a hierarchical fashion representing a typical career pattern in a given industry. The client's, counselor's, and family members' reactions to these possible vocational roles are, however, critical to understanding the suitability of each recommendation.

In relation to stable client characteristics, important job/person match issues should be discussed, i.e., work demands or psychological climate aspects of different jobs that would or would not be consistent with client preferences. Data for these conclusions can be drawn from occupational information resources regarding specific jobs and from results generated by such DEP elements as the USES Interest Inventory, the GATB/NATB, and the 16 PF-E.

Employability strengths and weaknesses should be behaviorally described based on results from the Work Personality Profile, the Work Performance assessment, and the simulated job application and interview. These assets or limitations should be related to a specific job seeking or maintaining demand such as those identified in a recent literature review (Roessler, 1983). Employability interventions should then be specified for critical employability skill deficits.

## Employability Interventions

Interventions suitable for modifying functional vocational capabilities can be developed from resources describing career adjustment (Bolton & Roessler, 1982), social skills training, and work adjustment. For example, in the area of job maintenance, we have previously outlined four modules for development: Interpersonal/social demands of work-dealing with co-workers, Interpersonal/social demands of work - responding to supervisors and employers, Organizational adaptability/conformity to work setting rules, and Position performance (Roessler & Bolton, 1983, p. 17).

Each employability module will help trainees improve their capabilities to (a) assess situations (when should one use these skills?), (b) process or make response decisions (What are the various response options, and (c) respond appropriately (how can one translate response options into behavior?). The format for the modules will follow social skills training principles, e.g., (a) describe the behaviors involved and their importance to success on the job, (b) model correct application of the skills in an appropriate context or contexts, (c) rehearse the skill components through role-play situations or social interactions, (d) reinforce correct application of skill components, (e) identify specific aspects of the performances that need to be

Figure 1

Major Components of a Diagnostic Employability Profile

| CONSTRUCTS | MEASURES | INTERVENTIONS | DESIRED OUTCOMES |
|---|---|---|---|
| Stable Characteristics | | | |
| 1. Aptitudes | 1. GATB/NATB | 1-6. Occupational information, vocational counseling, adult education. | 1-6. Self-awareness, job/person match. |
| 2. Interests | 2. USES Interest Inventory | | |
| 3. Personality, i.e., performance inhibitors | 3. 16 PF-E | | |
| 4. Intelligence | 4. WAIS, OTIS, BETA | | |
| 5. Basic Academic Skills | 5. WRAT | | |
| Modifiable Characteristics | | | |
| 7. Employability Maturity | 7. Employability Maturity Interview (EMI) | 7. Problem-solving, decision-making training | 7. Realistic choice making |
| 8. Job seeking | 8. Simulated job interview and application | 8. Job seeking skills training | 8. Job acquisition |
| 9. Job maintaining | 9. Work Personality Profile, Work Performance Assessment | 9. Behavior modification, social skills training | 9. Job maintenance |

changed, and (f) encourage generalization of skill improvement of the natural environment through homework assignments.

## Conclusion

Increased emphasis on employment as an outcome in vocational rehabilitation has resulted in more attention to the concept of employability. Defined in terms of stable and modifiable characteristics, employability can be diagnosed through a combination of of traditional psychometric and behavioral assessment techniques. Results of these strategies combine to form a Diagnostic Employability Profile indicating important job/person match and skill training considerations. Proper use of this DEP contributes to the enhancement of client employability, and thus to the employment success of individuals receiving rehabilitation services.

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# VOCATIONAL ASSESSMENT OF LEARNING DISABILITIES

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**ABSTRACT:** In light of the fact that the incidence of learning disability has been estimated as representing up to 25% of the school population (Hurst, 1968), it is not surprising that in recent years there has been increasing recognition that there are many individuals who having previously experienced academic difficulty are now, as adults, experiencing vocational difficulty. This papers examines one reason why this problem has not received much prior recognition, the relatively unique diagnostic problem presented by a learning disability.

Unlike many disease entities which are based on specific laboratory and clinical findings, learning disabilities are typically defined on the bases of statistical formulae which determine criteria which must be general, the diagnosis of learning disability requires a certain measure of discrepancy between measured ability (IQ) and academic achievement (reading or counting skills), wherein the discrepancy is presumably due to some type of neurologically based limitation on information processing.

Because the presumptive etiology of specific learning disability is of neurologic origin, and the requirements for eligibility depend on psychological assessment, a neuropsychologically focused vocational evaluation is the diagnostic procedure of choice. This will help put into perspective the ways in which such evaluation can be utilized in optional fashion for sorts of data which can be expected from a comprehensive neuropsychological evaluation of vocational potential.

## Cerebral Hemispheric Specialization for Information Processing

In almost all right handed and the majority of the left handed people, the left cerebral hemisphere is specialized for processing information which is primarily verbal, logical, sequential, abstract, and analytic. Conversely, the right cerebral hemisphere specializes in processing.

## Cerebral Hemispheric Asymmetry

In approximately 77% of both adults and children there is convincing evidence that the two cerebral hemispheres are asymmetric both in size and functional efficiency (Geschwind & Levitsky, 1968; Hartlage, 1982). This is an important concept for vocational planning, since a number of worker trait characteristics interact with specific learning disabilities (or aptitudes) on the basis of functional cerebral hemispheric asymmetry.

Individuals with dysfunctional right hemispheres, in addition to being at risk for visual-spatial learning disabilities and work related problems, tend to be more inclined to impulsive, less reflective approaches to problem solving, in what neurologists often refer to as "la belle indifference" life styles. An individual with right cerebral hemisphere dysfunction resultant from a stroke, for example, may commonly deny any impairment or problem, even though the sequelae have left considerable weakness of the left side of the body or even a left hemiplegia. Such individuals often respond impulsively to questions, giving an impression of lowered ability levels than they possess, or give occasionally bizarre responses to personality assessment measures, giving an impression of impaired reality testing. With left hemisphere dysfunction, in addition to language impairments, individuals are likely to be much more uncertain and tentative, in what neurologists refer to as a "catastrophic reaction." An individual with left hemisphere problems following a stroke, for example, is likely to require a great deal of reassurance and encouragement, and to suffer from depression and feelings of helplessness. Such individuals are often doubtful of their own abilities, and reluctant to respond to questions about whose answer they aren't certain may give an impression of greater mental impairment than they actually suffer.

In milder forms of lateralized cerebral asymmetry, right hemisphere deficient individuals are more likely to appear careless and uneven in their application of attention to a task, and to be comparitively poor in monitoring their own behavior. Left hemisphere deficient individual are often seen as lacking initiative, perhaps being too compulsive, and having difficulty adjusting to changing work situations. The behavioral differences associated with cerebral hemispheric functional asymmetries tend to be especially pronounced among individuals who have had neurologically mediated learning problems of a long standing duration, probably reflecting the individuals' attempts to deal with their selective cognitive processing weaknesses. The child who has always experienced difficulty dealing with such right hemisphere dependent tasks as picture puzzles, fine eye-hand coordination tasks, and spatial orientation, is more likely to try to use language or other left hemisphere mediated abilities to solve problems, while the child with chronic language problems may find greater satisfaction in dealing with activities where doing rather than talking about a task is more likely to be met with success. Thus we find a number of various historical attempts to classify individuals according to their approaches to problem solving (Gardner et. al., 1959; Witkin et.al., 1962) which have striking resemblances to the sorts of uneven mental strengths attributable to functional cerebral hemisphere asymmetry (Hartlage, 1982).

Learning disability theorists have shown fairly consistent attention to functional neurologic asymmetry in their attempts to classify learning disabilities, as represented by Bannatynes "spatial" vs. "linguistic" psychological learning disability classification (Bannatyne, 1968) or Boder's neurological "hyseidetic" vs. Dysphonetic classification of learning disabilities (Boder and Jarrice, 1982).

The role of functional cerebral asymmetry as related to learning disability is especially important for intervention planning, since there is evidence to suggest that neurologically mediated behaviors are selectively influenced by use or disuse, with those functions which are comparatively less used tending to have reduced output of transmitter storage vesicles to adjust for the decreased need (Aletta and Goldberg, 1982). Thus an individual whose preferred mode of information processing involves linguistic, sequential, analytic cognitive approaches may be expected to become not only less efficient but in fact less functionally capable of information processing involving spatial, holistic, simultaneous cognitive approaches. Although this phenomenon has given some encouragement to special educators who wish to remediate deficit functions by encouraging their increased use, review of the fairly comprehensive literature on the topic supports and emphasis on focusing attention on stronger information processing systems, both as a means to maximize a given individual's likelihood of success on a given task and as a means of avoiding frustration and discouragement by focusing on a relatively weak processing system (Hartlage & Telzrow, in press). If one recognizes the fact, for example, that poor performance on word recognition is caused by a dysfunction in the central visual process (cortical blindness), it is obvious that approaches toward remediation of the deficit are not nearly so likely to prove successful as are approaches to compensation for it, such as utilizing auditory or tactile processing modalities. Conversely, of course, if poor word recognition occurs in an individual with intact neurological mediation who has not been exposed to an opportunity to learn to read, remediation of this deficit by tutoring or educational enrichment represents a more reasonable strategy. Neuropsychological assessment of learning disabilities can thus be of considerable value in the differentiation of which deficits in a given processing system are due to neurologically limiting substrates, and thus will be more amenable to substitute or compensatory intervention, and which reflect more environmentally limited functions which can be alleviated by direct remedial approaches. In this respect, rehabilitation intervention takes the form of helping the client maximize vocationally relevant strengths by correlating neuropsychological findings with specific jobs in which the learning disabled client's residual functional capacities will be of most utility and in which the functional areas of learning disabilities mediated by neuropsychologically limiting substrates will be least required for successful job performance.

## The Intelligence - Learning Disability Interaction

Although by mandate the diagnosis of learning disabilities depends on a discrepancy between measured ability (IQ) and academic achievement (reading or counting grade level), the absolute level of mental ability of individuals with learning disabilities is an extremely important consideration in the development of a realistic vocational plan for a learning disabled client. An individual with an IQ of 140, for example, with a significant learning disability involving counting and mathematical skills (dyscalculia), may still have counting and mathematical skills at approximately the average level: with an IQ of 140, computational skills at a level appropriate to an IQ of 100 represent a significant discrepancy, but not one which is all that vocationally limiting for most work. Conversely, an individual with IQ and computational skill appropriate to IQ 60 has the same absolute magnitude of discrepancy between ability and achievement, but would be limited to jobs not requiring computational skills much above the third grade level.

In this respect, there is need to evaluate the specific vocationally limiting features of the learning disability in light of the global level of mental function in order to generate an initial overview of vocationally feasible goals. Next, the levels of mental function mediated by each cerebral hemisphere can be evaluated (by comparing verbal with performance IQ on the Wechsler scale). Finally, the impact of the specific learning disability, in the context of of global and specific intellectural strengths and weaknesses; can be incorporated into a profile to compare with job requirements from the Dictionary of Occupational Titles and other relevant sources. Although not necessarily so, there is usually a fairly close congruence between depressed IQ scores on verbal (or nonverbal) scales, and specific learning disabilities involving language (or spatial) abilities. This occurs because, although learning disability is diagnosed on the basis of a discrepancy between ability and skill, the underlying neuropsychological substrates of verbal IQ tend also to subserve language abilities, so that a learning disability involving language comprehension will commonly be found in a individual who also has comparatively poor performance on such Wechsler verbal subscales as comprehension, information, similarities, or vocabulary. In a similar fashion, a learning disability characterized by poor spatial ability or poor eye - hand coordination will typically be reflected in comparatively poor performance on Wechsler subscales like block design and object assembly.

### Specific Learning Disabilities and Vocational Planning

Learning disabilities involving language, the dysphasias (usually involving the left cerebral hemisphere), can include receptive (typically portions of the middle temporal lobe, the arcuate fasciculus, Wernicke's areas), expressive (typically anterior portions of the cerebral hemisphere, especially Broca's area), or both modalities. A special type of language disorder, dyslexia (usually associated with the angular gyrus area of the left parietal lobe), refers to a condition in which reading uniquely impaired, although there need not be any impairment in comprehending spoken language. The academic correlates of these specific impairments, even when they occur in isolation, often go well beyond what might be attributable to the isolated learning disability. The individual with chronic reading disability will typically have difficulty with most school subjects which have test questions or homework assignments requiring reading, and will not uncommonly fall progressively farther behind in general fund of information, vocabulary, and other areas which normally depend on reading for normal mental progress. Such a learning disability, while educationally very handicapping, need not present too formidable a barrier to vocational habilitation, provided the individual possesses other work related abilities which can be applied to job titles wherein reading sophistication is not required. For such an individual, relating actual reading skill to the G.E.D. requirements of given jobs can normally identify a fairly wide range of vocational options, at least in the lower skill level job families. It is at this point that neuropsychological assessment can play a most useful role, since such assessment can fairly readily identity the specific (dyslexic) component of more widespread prior school difficulties. For individuals with more pervasive dysphasic problems involving both receptive and expressive language processing disabilities, planning needs to take into account both training and placement considerations. Training for such individuals generally needs to focus on the more intact visual-spatial modalities, where pictorial representation, "hands-on" training, and repetition will be more effective than lecturing or similar approaches to instruction. With respect to job placement, such individuals tend to have better long term vocational prognoses in jobs where their comparatively strong visual-spatial skills can be brought to bear.

Individuals with dyspraxias (If dyspraxias involve executory problems, this more likely involves posterior right parietal areas, eg. Brodmann area 18), reflected in poor eye - hand coordination or spatial problems, profit from job preparation wherein instruction focuses on language based sequential instruction emphasizing the "why", rather than reliance on more visual aids: for such individuals one picture is usually NOT worth ten thousand words! Placement can focus on work families wherein relatively better language skills can be the mainstay of successful job performance, and jobs where fine visualmotor performance is required can likewise be avoided. Depending on the individual's mental ability, and the range of education feasible, individuals with language based learning disabilities but comparatively good right cerebral hemisphere medicated abilities are more likely to do best in jobs utilizing strengths, such as assembler, inspector, tool and die maker, skilled trades, drafting, engineering, and, if the individual is quite bright, specialized fields like surgery. For the individual with better language skills and learning disabilities involving visual-spatial abilities, jobs like sales, clerking, technical writing, teaching, and if the individual is quite bright, psychiatry, represent jobs wherein comparative strengths can be brought to bear on meeting work requirements.

The focus on comparative strengths may well be the hallmark of successful rehabilitation or habilitation planning for individuals with learning disabilities. A learning disability which has not responded to twelve years of educators' attempts at remediation is not a good candidate for a "quick fix" by some job training program aimed at overcoming a chronic skill deficit based on underlying neurological dysfunction. Rather, by focusing attention on those things the client does well, building on each person's unique set of aptitudes and strengths, as revealed by careful neuropsychological assessment, can the client's job potential be maximized in such a way as to help him or her best match his or her own vocationally relevant assets to the world of work.

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# VOCATIONAL ASSESSMENT OF SPECIAL POPULATIONS: VOCATIONAL ASSESSMENT OF DEAF AND HEARING IMPAIRED PERSONS

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**ABSTRACT:** Vocational assessment of deaf and hearing impaired individuals offers vocational evaluators a number of challenging problems. This paper examines general characteristics of deaf and hearing impaired persons, problems associated with the vocational assessment of these persons, methods and procedures which can be effectively used in accomplishing the assessment, and preparation by staff needed to accomplish an effective vocational assessment of the population.

Deaf and hearing impaired persons, while being a somewhat diverse group, share common characteristics such as the client's inability to communicate, the client's lack of understanding of the purpose of vocational assessment, less than full participation by the deaf client in assessment tasks, and limitations of assessment instrumentation. An indepth review of the procedure and methods used by the evaluation unit at the E. H. Gentry Technical Facility of the Alabama Institute for the Deaf and Blind is presented as a structure for assessment that has proven effective with a variety of deaf and hearing impaired persons. The importance of planning and advanced preparation by the evaluation staff in the assessment of deaf and hearing impaired persons is discussed in terms of communication ability, proper referral information and its review, program orientation and client initial interviews.

The vocational evaluation of the deaf and hearing impaired individual offers unique and challenging problems to a vocational evaluator. Because of the nature of the disability and its associated language acquisition problems, the evaluator is immediately confronted with the problem of communication. It is likely that the deaf or hearing impaired person may have difficulty understanding what evaluation is and why it is important. He may have difficulty in understanding instructions, the reasons for assigned tasks, and the relationships between tasks assigned and real work situations.

Deaf rehabilitation clients have been described as falling within three broad categories across a continuum form lower functioning to higher functioning (Watson, Anderson, Marut, Ouellette, and Ford, 1983). Lower functioning clients are described as severely disabled and/or multihandicapped, generally with limited social, academic and vocational skills and fall at one end of the continuum. The opposite end of the continuum represents higher functioning individuals who are capable of post secondary and academic skills are better developed than the lower functioning group but who have not attained the levels represented by the higher functioning group. This description provides a very general framework for viewing deaf clients as a group; however, when viewed as individuals within the group, placement into a category is not so easy. Many individual clients possess characteristics from two or more groups. It is sometimes helpful to speak of groups in generalities; however, one must agree with Gary Austin's (1983) statement that each person is an individual and must be treated with a respect for that individualism if we intervene in their lives. Evaluators then, must plan evaluations on an individual basis, using procedures that best fit that individual. Vocational evaluation of a deaf client begins before he physically enters a center.

A considerable amount of planning and staff preparation is necessary in order to formulate an evaluation plan for the individual. It is not possible to overemphasize the importance of good referral data and staff communication ability. Both are of paramount importance to effectively serving this client population and obtaining suitable outcomes.

Communication in necessary to the evaluation process and must be effected if valid assessment is to achieved (Watson, 1976). Accepting this premise, the ability to use sign language effectively is a prerequisite for any evaluator who works with deaf individuals. This goes beyond the mere ability of the evaluator to sign English words or phrases and to fingerspell. Deaf clients arrive for evaluation with varying degress of sign language ability and must be dealt with on their respective levels. More often than not, the client uses some level of American Sign Language, often accompanied by many "homemade" signs and gestures. The evaluator must be skilled enough with sign language to effectively communicate on the client's level. This skill is not easy to develop, and without constant use, is even harder to maintain. The basics of sign language expression are easy to learn; however, a considerable amount of experience with a variety of deaf individuals is necessary to develop proficient expressive and receptive communication skills and frequent exposure is necessary to maintain these skills. The evaluator who has contact with only an occasional deaf person will find it difficult to develop and maintain good manual communication skills. In this situation, it is advisable to use a qualified interpreter to aid in the evaluation.

It is difficult to locate and employ a qualified vocational evaluator who has good manual communication skills; thus, most evaluation center will find it necessary to train evaluators in the use of manual communications. In centers with a large population of deaf and hearing impaired individuals, the attainment of a specific level of competence in manual communication within a reasonable time frame should be a condition of employment for all staff. This can be accomplished by requiring individual in-service courses in manual communication and giving the evaluator the opportunity to work directly with deaf clients under the supervision of a skilled peer. Since communication is basic to the acquisition of accurate evaluation data, and this data is a fundamental part of the rehabilitation plan development, it is imperative that the communications link between the deaf client and the evaluator be established.

Also of substantial importance in effective service delivery to deaf clients is the advance review of good referral information and the utilization of this information in formulating an individual's evaluation plan. Watson recommends the following elements of biographical referral data: personal data, medical information, ophthalmological and optometric information, audiological and otological information, educational information, communication skills and narrative information (Watson, 1976). To this list should be added previous employment information. To the evaluator who is experienced in working with deaf clients, this information begins to give him a picture of the client's past experiences and helps him to begin to devise an evaluation plan, tentatively select instruments, and list points to be clarified later. This gives the client and evaluator common ground on which to begin an evaluation program. It is the responsibility of the evaluator to make the rehabilitation counselor aware of the importance of the information requested and to demonstrate its importance by using it to the advantage of the client and counselor. Counselors are more inclined to make extra effort to supply substantial referral data when tangible evidence of its use is demonstrated.

Another element of planning that makes a contribution to effective service delivery is extensive client orientation, not only to the physical plant and services, but more important, to the reasons for his being at the center. Clients often arrive at a rehabilitation center with a variety of conceptions regarding why they are attending. For many, it is the first time away from home. Explanations of reasons for rules and regulations, answers to the client's individual concerns, given by a person who is skilled in communication, can help to insure understanding on his part and facilitate his full participation. The evaluator gains benefit from observations made by the person conducting client orientation. Significant observations regarding communication levels, social interaction, and adaptability to new situations can be made at this time.

In the evaluation department at the E.H. Gentry Technical Facility of Alabama Institute for the Deaf and Blind, evaluations were performed on a total of 117 deaf clients between January, 1983, and July, 1984. Of this group, 76 were high school students who attended the Alabama School for the Deaf, and 41 were regular Vocational Rehabilitation clients. During this time period, the typical deaf client was a male, 20 years of age, who had completed 9 1/2 years of formal education. He had a measured I.Q. of 90, performed math operations at the 5.0 grade level and had a vocabulary grade level of 4.2 with a comprehension level of 4.4. He had minimal (less than 1 year) work experience in a laborers job.

New clients enter the Gentry facility once each month. Each evaluator is assigned a case load of incoming clients and reviews all available case referral information on his clients. From this information, a tentative evaluation plan is conceived, and a list of questions to be covered in the initial interview is prepared.

When the client arrives, he is given a thorough orientation to the facility and a brief tour of the city. Orientation also includes interviews with medical personnel, dormitory staff, social services staff. The orientation phase lasts two full days and is supervised by the client's case manager who, in the case of deaf clients, is a person highly skilled manual communication. A part of orientation is a visit to the evaluation unit were the client has an opportunity to meet his evaluator.

The initial interview with the client is extensive and serves a number of purposes. The client's mode of communication is established, and observations of communication competence begin. Rapport is established with the new client, and a thorough explanation of the evaluation program is presented to him. It is in this session that the evaluator begins to determine the client's communication level. The evaluator also elicits information to clarify any questions generated by the referral information and attempts to ascertain other information that may have been omitted. Whenever permitted by the client's level of communication, he explains the referring counselors questions in order to make clear to the new client why he is being evaluated. In cases where the communication level is so low that meaningful explanations are not possible, the interview may consist of the client and evaluator touring the evaluation unit in a thorough orientation to work stations in order to help the client gain some knowledge of what to expect. In all cases, an attempt is made to elicit information regarding the client's interests and future goals. This serves as a springboard for placing the evaluation plan into operation.

Evaluation tasks used with deaf clients at the Gentry Facility not only produce hard data related to specific skills, but also give the evaluator ample opportunity to observe the client firsthand in the testing situation. This observation is critically important since it provides key information regarding work habits and job readiness. Factors such as persistence, time economy, appropriate social interactions, reaction to criticism and to praise, and the degree to which direct supervision is needed are readily apparent. It is important to the acquisition of accurate data to determine if a deaf client is participating to his fullest on the tasks. Close observation provides clues to help the evaluator make this determination. It is important that the evaluator maintain good rapport with the client and offer continued encouragement and explanation of tasks to insure the client's full participation. It has been our experience that the majority of deaf clients respond positively to this extra personal attention.

Whenever possible, the evaluation begins with academic testing. Reading vocabulary and reading comprehension are measured by the Gates-MacGinitie Reading Test, Level E, Form I. This test provides norm groups for comparison from fourth grade through twelfth grade completion. Since our clients are to be competing for employment with the general population, it yields more accurate information to compare them with general population norms. The Level II math portion of the Wide Range Achievement Test is the instrument of choice when measuring ability in arithmetic. On occasion, it is of advantage to use the Level II reading portion of the WRAT with persons of very low reading ability in order to obtain some measure of functioning below the level measured by the Gates--MacGinitie.

Intellectual assessment is accomplished through individual testing using the Performance section of the Wechsler Adult Intelligence Scale--Revised. On occasion, when the client's interests indicate college training, the Verbal Section is also administered. When college training is in question, we agree with Falberg (1983) that, without assessment of the deaf client's current verbal functioning skills, insufficient data is available upon which to base a prediction. Another instrument often used is the Raven Standard Progressive Matrices.

Because often a deaf person's store of vocational knowledge is limited, interest testing is important. If the client's reading level is sufficient, the Kuder General Interest Survey is used. For lower language level clients, the Geist Picture Interest Inventory (REV.) is administered. Occasional language interpretation is necessary on both tests. This is permissible since the objective is to measure interests, not reading skills. Interpretation of the results is important for either test. Since interest inventories are essentially self-report instruments, the client is the final judge of the validity of the results.

The assessment of independent living skills is a critical factor. A client may have solid aptitudes and potential for scores of jobs; however, his chances for maintaining successful employment are often dependent on his ability to live independently. It is the policy of our facility to assess the person's skills in the critical phases of independent living and recommend remediation of weaknesses either prior to or in conjunction with vocational training. Phases assessed are money management, occupational adequacy (work habits, job acquisition skills), family life, community living, health and safety, communications, transportation, personal and home management. Assessment is through a variety of measures including direct observation, evaluator--developed tasks and tests, formal measures such as the Street Survival Skills Questionnaire and Valpar Unit #17, and by direct one to one questioning of the client, using questions phrased in such a way that the client must demonstrate basic knowledge in his answers.

Standardized dexterity testing is accomplished through the use of the Pennsylvania Bimanual Work Sample, the Crawford Small Parts Dexterity Test, and the Purdue Pegboard. All of these instruments can easily be explained or demonstrated and provide a measure of manual and finger dexterity. These often are viewed by the clients as competitive, thus insuring full participation.

As a measure of a person's ability to work in a purely physical task requiring prolonged standing and rapid manipulation of objects and as a measure of physical stamina to maintain pace, the evaluation unit at E.H. Gentry employs one or more of a group of work samples developed by National Industries for the Blind research. While these samples were originally developed for blind clients, only slight modification gives them general application to most kinds of cases, and they have proven beneficial with deaf clients. Two of the samples are termed electro-mechanical and employ a work pace-timer developed to give the client instant feedback when he slows his pace. Another is an assembly task in which the client is required to use both hands to complete two assemblies simultaneously. All these work samples require prolonged standing and rapid, accurate hand and arm movement. Performance is measured against a production standard based on average sighted workers.

Aptitude identification is a key factor in vocational evaluation and receives considerable attention in our unit. The Dictionary of Occupational Titles identifies eleven critical aptitudes and uses these, along with other factors, to construct job profiles. Aptitude identification is accomplished at Gentry through the use of several instruments. The General Aptitude Test Battery is employed in all cases except extremely low functioning deaf clients and we have experienced very good success with its use. It provides an excellent vocational counseling tool and basis for occupational exploration.

An additional aid in identifying aptitudes is found in the more global components of the Valpar Component Work Sample Series. These units, used with video-taped instructions, have problem popular with the deaf clients at Gentry and have provided very useful data. A wide variety of norm groups. Performance on individual component units can be related to a variety of existing occupations and provides more supportive information for vocational counseling.

Once information regarding all factors outlined has been gathered and organized, a frank discussion of the client's strengths and weaknesses form the basis for program recommendations. It is occasionally necessary to allow the client a trial period in a vocational training area. More often, the client has made a decision and is ready to make a commitment to a program of training or adjustment that will enable him to advance.

To determine the effectiveness of the evaluation program at E.H. Gentry, the same group of deaf clients previously mentioned was selected for study. Since most of the high school students returned to school, no data was available for comparison with this group. For this reason, only the full-time rehabilitation clients were selected for study. Evaluation findings and recommendations were compared to the actual training programs selected by the clients who had experienced the evaluation procedures as outlined. The criteria used was successful program completion or average progress ratings on monthly progress reports. Of the group who did not complete training or adjustment, approximately 50% self-terminated for reasons other than training related, and the other 50% were facility terminated for disciplinary reasons. The study group was comprised of 41 persons, 28 males and 13 females. Ages ranged from 16 years to 47 years with an average age of 24 years. Fifteen percent of the group were multi-handicapped. Aside from the average age, there was no appreciable difference between the group of 41 and the total group described earlier.

Of the study group, 10% chose to leave the facility program after evaluation, and information is not available regarding the outcome of evaluation. An additional 5% left the facility program; however, follow-up information was available. They were counted within the group who entered vocational training. Fifty-four percent of the group was referred for vocational training and entered training in the recommended area or in a closely related area based on evaluation information. While the majority entered training at E.H. Gentry Technical Facility, four other trade schools, technical colleges or junior colleges were chosen. Thirty-six percent were referred full time to the Rehabilitation Center section of E.H. Gentry for remediation of deficits in independent living skills or for work adjustment problems.

Of the group who was referred for vocational training, 28% have successfully completed the training, and 36% actively being trained. The remaining 36% terminated during training.

Of the group who were referred to the Rehabilitation Center, 36% have completed adjustment programs and have moved into vocational training or employment, or are actively seeking employment. Twenty-eight percent of the group remains in adjustment or independent living skills training. Coincidentally, the same percentage (36) of persons terminated as in the vocational training group.

Because the adjustment services figure only reflects the accuracy of identified adjustment needs and not the accuracy of the entire evaluation insufficient follow-up information after adjustment is available to test the accuracy of vocational recommendations with this group. Follow-up will continue. Of the group who was referred for vocational training, it has been determined from training progress reports that evaluation findings and recommendations were accurate in 86% of the cases. We think that his represents an excellent success rate.

In summary, we at the E. H. Gentry Technical Facility believe that there are several key factors in constructing a vocational evaluation unit which can effectively service deaf clients. First, and most important, is the ability to communicate with the client on his level. This is not only basic to the evaluation process, but is an absolute necessity in order to provide the feedback and day-to-day counseling necessary to maintain the client's participation. Pre-planning and a good orientation to the facility is necessary to get the client started in a positive frame of mind. Rapport between client and evaluator is absolutely essential with deaf clients, and the client should be provided with explanations and feedback on a continual basis to maintain his interest and assure his participation. A wide variety of good instrumentation is necessary for use with many levels of deaf and hearing impaired clients. With these factors in place and conscientiously applied, successful evaluations can be performed with deaf persons with consistency. We consider the evaluation program at E.H. Gentry to be a successful program as demonstrated by the study quoted in this paper; and we take pride in the belief that we are making a worthwhile contribution to the rehabilitation of deaf individuals.

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